Nisarg Shala

nature school for children

a set of 3 books

Part 1

Nisarg Shala

nature school for children

Part 1

Manual for Teachers and Parents
Eco-activities for Children

This set of 3 books can be used for
an Environmental Education Programme
for students aged 10, 11 and 12 years
(Standards 5th, 6th and 7th)

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adhivas
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The contents of this book can be used for the purpose of Environmental Education and for spreading Environmental Awareness, by giving due credit and attribution to the authors and their work.

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Nisarg Shala – Part 1

Age – 10 years (for 5th standard)

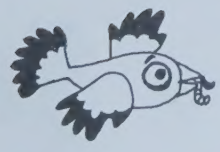
A **'Special Environmental Education Programme'** can be undertaken for three consecutive years in schools with the help of Nisarg Shala, a set of three books.

This is Part 1/Book 1 and contains about **50 activities** that can be conducted throughout the year excluding examinations and holidays.

The activities can be conducted on **every Saturday or any weekday** that is convenient as per the school schedule.

Alternatively, a condensed module of about 25 activities can be taken up for a shorter duration. Details can be found on the last page.

The Special Environmental Education Programme can be concluded with an **'exhibition of the students'** work completed throughout the year.



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There's no ask too big!

We, at EFL India, understand that small is just a state of mind. We believe that a seed of an idea can spark innovation. We understand how a small act can mobilise a revolution. As an integrated logistics provider, we know that the shortest distance between two points isn't always a straight line. It's the immeasurable potential that draws our attention. That's why we look at life's small things with the biggest heart. And when we put our heart into something, there's no ask too big.

As climate change impacts how every being lives, we understand that a fitting response for the world's biggest and most pressing ask, is the need of the hour. Hence, we have in place processes to ensure we keep the planets and its inhabitants' best interests at the core of how we work. But we believe that to transform human behavior, we need to do more. We need to empower the leaders of tomorrow and instill in them, a sense of responsibility. To do this, we need to start at the very beginning.

Thus, we partnered with Oikos to present Ecological educational content through 'Nisarg Shala', to get school students involved in understanding and caring for nature at an impressionable age. By undertaking these activities, we hope each student from every part of the country becomes an enthusiastic spokesperson for nature. So when it is their turn to take the reins, they are well-equipped to nurture a greener and healthier planet.

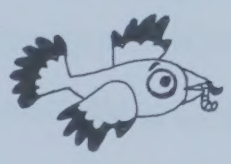
With this book, we intend to sow the seed of inspiration, unlock potential and mobilise a larger movement for a better tomorrow. Because we believe that when young minds come together, unwavering in their resolve to change the world, there's no ask too big.

- Team EFL

Preface

The current education system in India, does not do justice nor give due attention to the study of Environmental Science and environment related practices. Higher education is far from including it, however, there is some discussion around introducing environmental study at the school level. The subject matter of environment is covered to some extent through subjects like EVS and experiential learning activities, but these efforts are inadequate to say the least. Currently, there is a demand to include 'Environment' as a separate subject at the school level. But as is well known, once a field of study enters the education system as a 'subject' at school level and is examined through the traditional examination system, **the student can pass the examination without the subject being properly assimilated. This does not serve the basic purpose of introducing the new subject.** Hence, it is necessary to use a different method to teach the subject of 'Environmental Science' at the school level.

Before it is made a part of the educational system, *it must be understood that Environment is an inseparable part of human life.* Every aspect of the environment, its beauty or the science behind it or its conservation, must be experienced and at the same time inculcated in daily life by every human. It is essential to develop the understanding that a prosperous environment and a prosperous human life are intricately interconnected, and this knowledge can help an individual to grow into adopting an sustainable or pro-nature lifestyle. The real concern today is how to inculcate this understanding and awareness in our society.



Looking at this problem from the environmental point of view, the **subject being introduced at a young age is crucial than it being given a formal status in school education.** If the children consistently get an impactful experience of a sustainable lifestyle up to the age of 14 to15 years, they are more likely to live their entire lives with an awareness and sensitivity towards the environment and that is exactly what we aim for.

The members of Oikos are not only walking the path of environmental awareness, but are also guiding others on this path. Their team has been conducting outreach programmes to create awareness about the environment. They have not only seen and experienced 'Nature' closely but have incorporated the pro-nature lifestyle practices in their day-to-day living. Their thoughts and behaviour are aligned with the environment. The set of three books and the activities in this programme are a testimony to it and by virtue of being an elder, I give my blessings to their work!

The books have two types of activities - class work and field work. The programme maintains a perfect balance between the two. They have been designed in such a way that the school children will enjoy the activities and find them engaging. The interactive nature of the activities will ensure the children's interest and participation. The focus of this student-centric programme is on **learning rather than teaching.** Building on the knowledge that the children already have, the activities open doors to new information and experiences. Additional tasks like drawing, writing, creating something, etc. are also included. **'Observation'** is the essential part of every activity and some of the activities also involve simple experiments to be performed by the students. Additionally, there are poems, stories, dialogues, and also skits. Emphasis is put on group learning in these activities which also involve field visits and interviewing experts.

The highlight of the programme is that the students will experience a **large variety of hands-on activities.** This approach of learning is known as the **'Constructivism'** or **'Constructivist approach'** of knowledge acquisition.

The four main highlights of these books are - a) the **constructivist activities** adapted to the natural grasping process of the children; b) **age appropriate** experiential learning; c) the scope and presentation of the subject matter in **a holistic manner** d) a year long programme that can be conducted **without burdening the academic schedule.**

I have rarely seen such a thoughtful presentation of the subject thus far and personally appreciate that the team have travelled that extra mile to bring the thought into reality. I would like to wholeheartedly endorse this course to the schools and other voluntary organisations working for children, to transform the children's lives by creating an unbreakable bond with nature.

- Ramesh Panse, Gram Mangal, Pune

About the Book

While working in the domain of Environment for the past few years, we got multiple opportunities to conduct workshops on Environmental Education for children. We also got an opportunity to design a curriculum based on the environment and the surroundings for the students of 5th to 9th standard for a school run by 'Gram Mangal'. We worked with children in Zilha Parishad schools in Wai (Maharashtra), Goa, Ranathambore (Rajasthan) among other places. The experience of working with semi-urban, rural, and tribal children from various locations enriched us with knowledge and experience. In this journey, we realised that learning about the environment and surroundings is such a joyful experience. Learning about 'Nature' encourages us to step outside the classroom and connect with our surroundings, and this is what makes the study particularly enjoyable. Along with this joy, it gives **a sense of satisfaction along with new realisations.** It's a process which makes one aware of natural elements around us, one's actions affecting them and so it also makes one aware of ones own life! If education succeeds in creating these insights, we feel that its purpose will be served. Gandhiji said, 'I do not teach the children. I only try to awaken their consciousness, and then they will be able to learn on their own.' This can be achieved through the environmental education. The awareness about their surroundings will also help the students think about creating livlihood options by building a 'natural' capital.

The method of environment education is very important. It is not the 'teaching' that is important but 'letting students learn' is more important. It can be easily achieved through the experience-based and constructivist educational approach. Gram Mangal has set the guidelines on the same. According to them, a student is constantly acquiring knowledge and a teacher's role is only to facilitate the process. Learning is obvious and easy when the experiences are derived from the student's own surroundings. A teacher is not expected to 'teach', but just facilitate the experience of the different phenomena in the 'Nature' around and help them find the inspiration within themselves.

The teacher therefore plays a pivotal role in this method of education. The books are conceptualised for the teachers to be able to conduct activities for children. Based on our previous experience, we felt that the appropriate age to understand this subject should be 10 to 12 years and hence we decided to create the books for standards 5th to 7th.

We thank EFL, Global who has supported us to make this project a reality.

*The instructions given on the following pages are extremely crucial and we request the readers to go through them meticulously.

- Ketaki Ghate and Manasi Karandikar

Oikos for Ecological Services & Adhiwas Foundation, Pune

Vision

It is important to discuss a few fundamental questions here to convey the vision behind this project.

Why "environmental" education?

Environmental education means gaining awareness of one's surrounding environment and nature. This is the education that gives us an insight on how to live a happy, content and balanced life using the available local resources, biodiversity. This is the education, that helps us develop a lifestyle which puts minimal pressure on nature. This education will create a feeling of respect, love, confidence, and pride about the surrounding environment and nature. Once the students are connected to their own environment, they might make efforts to develop livelihoods in their own region. 70% of the Indian population is based in villages, and the migration towards cities for employment is ever-increasing. However, city life is undesirable and unpleasant for many people. The need of the hour is to generate employment at the local level making various 'options' available for earning a livelihood taking into consideration the local environment and resources. In a diverse country like India these options will change according to the regional geography. As Mr. Prakash Gole, founder of the Ecological Society of Pune, says in his book 'Vaastav' about how education should be -

"India occupies 2% of the geological area of the world but it hosts 8% of the total biodiversity of the world. This shows that India is bestowed with a rich biodiversity. Our education, technology, industry, businesses, agriculture need to be coherent with the diversity in our surroundings. Today's technology not only prioritises machines instead of manpower but also requires huge capital expenditure and a continuous supply of various natural resources. In short, it exploits Nature. On the contrary, ecological restoration and biodiversity conservation calls upon the use of manpower instead of machines. It means these processes are the panacea for today's unemployment. Skilful manpower is required especially for the techniques being developed today for the restoration of Nature which will prove to be a lifeline for many future generations. I would confidently say that nature-based education will brighten our future."

How should environmental education be? And how it can be imparted?

Once the importance of environment education is known, the next step is how to impart it. Experts have stated that instead of introducing environment education as a separate subject, we must design the entire education system aligned with an environmental approach.

Today's education system, teachers' mindset, and everything related to education will have to undergo a complete reform in order to achieve this. Overall approach of education system and multiple stages of this new system will have to be planned with profound thought and all-inclusiveness. Another key point here is to reduce the gap between conventional education and environmental education.

Conventional education, especially higher education is oriented towards materialistic achievements such as ever-increasing consumerism and economic growth and implicitly runs on the philosophy that the key to happiness and success is to increase one's capacity to consume. But it never reveals how this philosophy and consumerism directly affects the environment. Whereas environmental education teaches the necessity to control the consumerist mentality and be conscious towards 'Nature' in the process of development. Obviously, there is a gap between the two approaches. Government has tried to bridge this gap between the two approaches and introduced environmental education in schools and colleges but has not prescribed a specific method to teach the subject so that it serves the purpose. Generally, the geography teachers or the teachers teaching other subjects are forced to teach environmental education. Firstly, it is an added burden for them and secondly, since they do not have any experience of handling this subject, it is incorrect to expect them to convey the subject to the students. So the need is to empower teachers to handle this subject. Based on our experience, we prescribe/chalk out skills essential for an environment teacher.

What should be the qualifications of an environment teacher?

To start with, we might need two types of teachers. One, who has a profound knowledge and awareness about the surrounding environment, diversity, available resources, and the effects of their uses. And another, who can connect his/her own subject, a language or mathematics, to the environment. Then, environmental education can be guaranteed! There will be no need to teach the subject separately. Since there is no system to train teachers for this amalgamated method of education, the teachers are not equipped to do so. It is said that *If you TEACH alone, children will learn to TEACH. But if you teach to learn, children will LEARN.*

The present educational approach is driven by "teaching" instead of letting learn and that too, enclosed within the walls of a classroom. It is difficult to impart training on this subject to the students without giving them an actual experience of Nature. If the subject is a mere addition to their 'studies', then the students get bored of it. If we want the students to learn and assimilate this subject, then **the teacher must first learn and assimilate it himself/herself.** The teachers must also experience that learning about nature is enjoyable and not burdensome. They also need to sincerely understand why the students need to learn this subject.

The above discussion explains the need to train the existing teachers to effectively impart environmental education to the students. But considering the total number of schools in India and the total number of teachers, this process will take a long time. So other methods to equip the teachers to introduce 'environment and nature' to the students must be devised alongside. The present set of three books is our little contribution to devise a support.

How to use the Books

- In this environmental education programme, apart from the teacher who has taken responsibility of the programme, **participation of the entire school**, including other teachers, the principal, other staff is important and necessary. The parents can participate as volunteers, as the field activities require more than one adult to handle a group of students. Therefore, we insist that the activities must be planned together with everyone and the activity schedule should be shared with all the above members.

- The programme demands **more time** on the part of the teachers to prepare for the activities. For example, for the field activities, it is essential that teachers themselves visit and experience the activity at the intended location. The teacher needs to invest much more time in the planning and preparation than the time required for the actual activity. In some cases, the teacher may require a week or a month to prepare for an activity.

- The books are written for the teachers, and therefore we have used the language that can be understood by teachers. The teachers are expected to **use a simplified language** while conducting the activities with the students. The teachers are not expected to 'read out' the information from the books, but they must understand the information first, try the activity or experience the field related work first hand and then communicate with the students based on their own experience. A list of indicative and leading questions provided in many of the activities can also help in engaging the students.

- The **sequence of the books** is very important as the activities in these books have been designed in a specific order of progression. We recommend the programme to be introduced in the 5th standard. However, if it is to be introduced in the 6th or the 7th standard, please begin with activity 1 in first part and then go for parts 2 and 3. Please do not skip a book in case the program is introduced at a higher standard, as the progression of the concepts and understanding as planned in the books is important.

- The sequence of the activities is **based on the seasons** and therefore certain activities are required to be completed in the specific seasons. If an activity is skipped or missed, the opportunity to experience and learn about the season will present itself only in the subsequent year and keeping track will be difficult. Certain activities are planned multiple times during the year, for more than one season or month. This will help the students to improve their observation skills and derive motivation for self-learning. Therefore, it is necessary for a teacher to ensure that the activities involving 'regular documentation/notes and observations' are completed throughout the year.

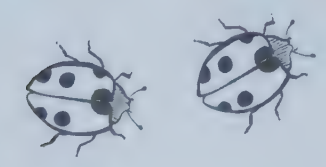
- These books try to cover many of the biogeographical zones in India, but some of the activities may not be pertinent to some geographical locations. Depending on the location of the school, the teachers may **skip the activities for which a direct on-site experience is difficult or impossible.**

- The students should have a stable emotional condition before starting an activity. Starting an activity in haste and informing the students about its objectives at the beginning may not be advisable for all the activities. The teacher should first initiate a casual conversation with the students about the topic, and once he/she is able to gain their attention the activity can be started.

- **New words** should be written on the board in bold letters and the teacher should gradually guide the students towards understanding the meaning of such words through various question-answers rather than directly telling them the meanings. This way, the students will learn this very process of learning new concepts. If the process happens organically and as per the inclination of the students, the finer the learnings will be. On the other hand, when the new concepts are directly taught or informed to the students through usual definitions, they are more likely to be forgotten.

- Creating the right atmosphere for the activity is also necessary and hence the **required material should be kept ready** in time in the class. The teacher may discuss about the material, how it was collected or was provided etc. with the students.

- **Reference books or field guides** related to the activity should be kept in the class and the teacher can capture the students' interest by discussing about the title of the book, giving information about the author etc. so that the students will be motivated to read the book.



- The school campus can be developed as an ideal **'green campus'** to offer a 'hands-on' and everyday learning opportunity for the students. The school campus can be divided into various sections according to the suitability of the areas for, agricultural beds, clusters of trees, shrubs, herbs, grasses, a pond and aquatic plants, a garden of medicinal plants, a butterfly garden, a bio-fence, etc. It will also help create different habitats in the school campus like - a grassland, a marshland, a rocky area, a woodland / grove, etc. A schematic map is given on page no. 97 as a reference for developing the green campus.

- Certain activities demand good sketching of the figures given, so the participation of the **drawing/art teachers** is very important for such activities. The teacher incharge of the programme should discuss the details of the activity with the drawing teacher beforehand. The school can provide the books to the drawing teacher at the beginning of

the academic year, so that he/she can have enough time to work on the drawings needed for the activities. Plan a schedule (with the exact day, date and time of the activity) with the drawing teacher for the illustrations that are to be sketched directly on the blackboard. This will allow the drawing teacher to understand the requirement for the illustrations and the time required.

- The interactions and **discussions with the parents** are also important as the students may require their help for some of the activities. The school can arrange a Parent-Teacher meet before beginning the environmental education programme in the school so that the parents are aware about their role in it. The books contain a 'Letter to the Parents' from the writers, which must be read out to the parents in the meeting and shared on email/what's app. The teachers should explain and emphasise the importance of this programme for the students and request the parents to help their wards whenever required. The teachers should discuss with the parents from time to time about the progress of the programme and get their feedback on how the students are perceiving the programme.

- If this curriculum puts extra pressure on the teacher, he/she may **take help of parents and other teachers.** The teacher may ask for volunteers in the Parent-Teacher meet and after completing a formal process for volunteer registration, may hold separate meetings with the volunteers to plan the activities over the entire year. The children will surely be more enthusiastic and excited if parents are involved in this programme.

- The books include 50 to 55 activities to be conducted through the year. The teachers should complete a minimum of any 40 to 45 activities according to the availability of time. Certain activities can be combined together, e. g. 'Visit to a farm' and 'Bird watching'. Similarly, some activities may be completed in less than the stipulated time. It is also possible to add homework to some of the activities, to reduce the time required for the actual session. Considering all the above factors, the teacher should plan the activities according to the available periods, the level of understanding and grasping power of the students and the compatibility of the activities. There are activities in these books which are related to the units in the course textbooks, hence the teachers may schedule such activities along with the completion of the related syllabus.

- The duration mentioned in the project is the time required for conducting the activity. The teachers should keep in mind that field visits will require more time and preparation, and plan accordingly.
- During the activities, students can be asked to **prepare slogans** based on the various units. The students can shout out the slogans during the parades on the Independence Day and the Republic Day celebrations.

- At the end of the year, an **exhibition** should be organised displaying the documentation/writing work, the collections, the creative items made by the students under different activities, e. g. the slogans, seeds, grass samples, herbarium, best out of waste items, photographs of the soil conservation techniques implemented by the students, design of agro-forestry planning, map of the locality, poems, stories, etc. Parents should also be invited for this exhibition.

- Please note that in these books, **the words such as teachers, children, and students imply all genders** and there is no intention of any kind of discrimination whatsoever.
- **We highly recommend conducting these activities within a group of 25 to 30 students. If there are many students in the class, split them in two groups and conduct the activities twice.**

Appropriateness of the Activities

The activities in this programme have been tested against certain criteria given below. Each activity was evaluated on the scale of 0 to 3, 0 being the activity which does not fulfil any criterion and 3 being the activity that gives full justice to all the criteria. In this manner, all the activities were evaluated and activities with 0 to 2 points were finalised after some work to improve their appropriateness.

After evaluating the activities on these criteria, it was observed that around 97% of the activities are student centric, 88% of the activities emphasize on proper comprehension by the students, 76% of the activities are based on constructivism, 73% of the activities include local examples, 66% of the activities involve actual participation and give direct experience and 40% of the activities are done in Nature. These activities are based on experiential learning, observation, documentation, conclusion, discussion and verification which will help the students develop a habit of self-learning. We are confident that the students will gain a good understanding of the Nature in their surroundings if these activities are conducted as per the instructions.

Criteria for the appropriateness of the activities

- **Constructivist approach:** is to gradually direct the students to the subject rather than directly teaching them. We have tried to achieve this by including methods like the leading question-and-answer lists, use of various teaching aids, engaging illustrations and images, experience of the actual activity on field or in the classroom etc.

- **Actual experience:** The activities are designed in such a manner that the students will actually visit the Natural sites and gain first-hand experience. The emphasis is on doing the practical activities, taking observations and measurements, interaction through different textures, smells, etc. in the Nature. Through these activities the students will get to witness the changes taking place in the Nature in each season.
- **Local examples and introduction to nature in the neighbourhood:** We have emphasised on local examples which will help in familiarising the students with their surroundings and the Nature in their city/ town/ village more consciously.
- **Improvement in observation skill:** The field activities naturally contribute to improve the observation skills of the students. The classroom activities have been designed in such a way that the students are encouraged towards learning from their own observations and are also required to put to use the observations from the field trips and thus keep on building on the learnings.
- **Expression & linguistics development:** Inclusion of exercises such as written expression, essays, poems, drawing, skit, etc. based on the observations made by the students help improve their skill of expression and language(s) competency.
- **Learning through action and experience:** There are activities which give the students an opportunity to learn by practically doing the activities or experiments and thereby gaining first-hand experience.
- **Participation of all the students (student-centric):** The activities have been designed by keeping the interest of the students at the core, through group or individual participation of students such that each child gets the experience of the activity.
- **Comprehension Development:** Use of the mediums such as activities, discussions, observations, interviews, etc., will help improve comprehension.
- **Orientation of students for physical parameters:** We have aimed at improvement in understanding of various life-skills, e. g. orientation and sense of directions, map reading, nature reading, measurements, writing, etc.

- **Development of a holistic perspective in the students:** The activities help to enrich the students with experience and thereby develop their approach to understand the local and traditional treasures in their environment as well as the approach to look at one's own actions critically and objectively.
- **Conveying applicability of the subject:** The activities help build 'planning and decision making' skills which will enhance many other aspects of the students' lives.
- **Value inculcation:** A few activities underline the importance of values and ethics in daily life.
- **Educational aids:** Various educational aids are used for the activities such as illustrations, pictures, images, games, slideshows, maps, various objects, etc.

- **Participation and awareness of the teachers:** The methodology of activities will also enhance consciousness and learnings about Nature among teachers.
- **Age group suitability:** The choice of activities is appropriate for the age group of the students.
- **Multiple intelligence:** According to the Multiple Intelligences Theory, the activities help in improving nature-based IQ and competencies in linguistics, mathematics among other things.

A Letter to the Parents

Dear Parents,

Hello!

We are pleased to present this hands-on environment and nature based experiential learning for your wards through this 'Special Environment Education Programme'. You all are aware about the need of conservation of Nature. These activity books will help the students get to know their environment in depth and inculcate respect for it. The books are written for teachers and parents and they are not supposed to be used by the students directly. With the help of these books a teacher can start the Environment Education Programme for the students between 10 to 12 years of age from his/her school. But this is not the responsibility of a teacher alone as the parents as well as all the family members are expected to help the student. For this, you need to spend some time to go through the books thoroughly, especially the preface and initial chapters to get an idea about what your child is learning.

We need your support in this programme since some of the activities require students to do the task at home, or to conduct interviews etc. Your wholehearted support and involvement in these activities will help the students learn a lot more.

We would also like to request the parents to participate in this programme as 'volunteers'. Many of the activities involve field work and the students are expected to visit different locations in groups, to observe, make notes, etc. It is a difficult task for one teacher to keep a watch on all the students and help them with the activity. We appeal to all the parents to help as a volunteer for field activities and wherever possible, in the classroom activities. Please speak to the teacher in advance and plan accordingly.

Your contribution will certainly help make this Environment Education Programme a success.

Thank you!

(Teacher should read out the above letter in the Parents Teachers Meet or circulate through digital media like email or whatsapp.)

A Letter to the Students

Dear Students,

Hello!

From now onwards, every Saturday will be full of fun. We are going to wander in Nature, in the neighbourhood in the city / town / village, on the hills, at the bank of the river or by the stream; observe the birds, animals, trees, insects, understand them; find their names, if not give them new names altogether, ... a lot of fun! ... And sometimes you tell us the things you know about the trees and animals...so what do you think ?

We shall have an activity every Saturday in the class or out in the field, sometimes individually, sometimes in groups, sometimes with teachers or also with the parents! But, what are these activities? It may be to measure the rainfall in our own neighbourhood or village. Or it may be to go on a trip to the banks of a stream, put paper boats in the water and measure the speed of water. Or to collect rocks and observe their different shapes, types and colours. Or may be to collect specific waste materials and make usable, giftable items out of it. Sometimes we shall read stories and poems and you will write a skit and perform before your parents and teachers. We shall also invite them for an exhibition of our collection of various objects, seeds, rocks and to witness all the experiments we have performed through the year. We shall plan all these activities together.

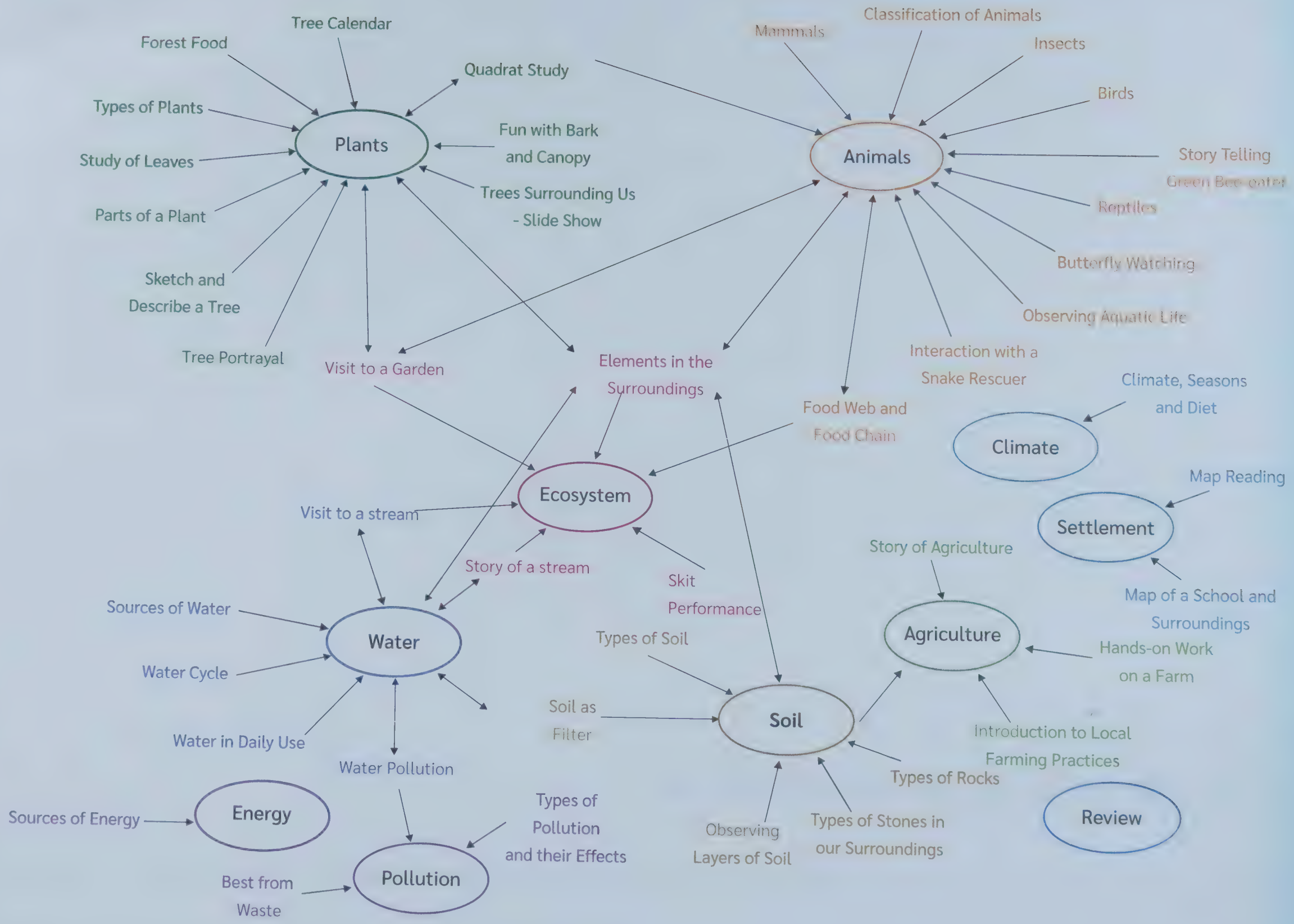
So, le t us begin !!!!

(Teacher should read out the above letter to the students before beginning the first activity.)

Units of the Activities

- Plants
- Water
- Animals
- Ecosystem
- Soil
- Agriculture
- Weather and Climate
- Energy
- Settlement
- Pollution

Correlation Between Activities



Activity List

Activity No.	Activity Name	Hours	Activity Month	Page Number
1.	Tree Calendar	1	June	23
2.	Map Reading	2	June	25
3.	Sources of Water	1	June	27
4.	Water Cycle	1	July	28
5.	Visit to a stream (1)	2	July	29
6.	Story of a stream	1	July	31
7.	Water in Daily Use	1	July	34
8.	Observing Aquatic Life	1	July	35
9.	Types of Plants	2	August	37
10.	Parts of a Plant	2	August	38
11.	Study of Leaves	2	August	40
12.	Classification of Animals	2	August	42
13.	Mammals	1	September	44
14.	Insects	1	September	45
15.	Reptiles	1	September	47
16.	Birds	1	September	49
17.	Butterfly Watching	2	September	53
18.	Interaction with a Snake Rescuer	2	September	55
19.	Quadrat Study	2	October	56
20.	Visit to a stream (2)	2	October	57
21.	Food Web and Food Chain	1	October	58
22.	Types of Rocks	1	October	60
23.	Types of Stones in Our Surroundings	1	October	62
24.	Review 1	1	October	63
25.	Types of Soil in the Surroundings	2	November	65
26.	Observing the Layers of Soil	1	November	67
27.	Soil as a Filter	1	November	68
28.	Elements in our Surroundings	1	December	69

Activity No.	Activity Name	Hours	Activity Month	Page Number
29.	Map of the School and Surroundings	2	December	70
30.	Story of Agriculture	1	December	71
31.	Introduction to Local Farming Practices	1	December	72
32.	Hand-on Work on a Farm	2	December	73
33.	Climate, Seasons and Diet	1	December	74
34.	Visit to a Garden	2	January	75
35.	Skit Performance	2	January	76
36.	Visit to a Stream (3)	2	January	78
37.	Sources of Energy	1	January	79
38.	Types of Pollution and their Effects	2	January	81
39.	Water Pollution	2	February	83
40.	Best from Waste	2	February	84
41.	Sketch and Describe a Tree	1	February	86
42.	Fun with Bark and Canopy	1	February	87
43.	Trees Surrounding Us - A Slideshow	1	February	89
44.	Story Telling	2	February	90
45.	Forest Foods	1	March	93
46.	Tree Portrayal	1	March	94
47.	Review 2	1	March	95

Important Instructions for the Field-visits

The teacher should find out information and try to visit the following sites near the school before starting the programme.

- River / streams
- Catchment areas
- Wilderness areas in the Village/town/city

Please give the following instructions to the students before every field-visit -

- Everyone must wear proper shoes while going on a field-visit.
- Watch out for thorns, insects etc. while walking on the field. Also, be careful while walking through the tall grass. Follow the 'path' to avoid snake or scorpion bite.
- Wear camouflaging clothes that are matching to the colours in the nature and avoid bright coloured clothes.
- Do not enter into thickets or pluck the leaves or the flowers without the teacher's permission.
- Do not run around and wander away from your group.
- Maintain silence while watching birds.
- Finish the observations in the stipulated time and return to the predetermined place (recognised assembly point) as instructed.
- Use the binoculars / magnifying glasses carefully and share them with others.
- Things to carry on a field-visit: a cap, an umbrella, a water bottle, a notebook, a pen, a pencil for noting observations.
- Carry the field guides for such visits if available in the school library.

Extra Reference Material

*Additional reading is necessary for some of the activities in this book. In the interest of space, it is difficult to give all the information here, so we have placed it on the website below. It has slide shows, images, videos, reading material etc. Please download, read and use those as per instructions given.

Study the coloured maps provided on the website for the activities with maps. If possible, take coloured photocopies of these maps for the students. Show the coloured photographs of the birds, the animals and the plants that are also available on the website.

https://www.adhiwas.org/nisargshala

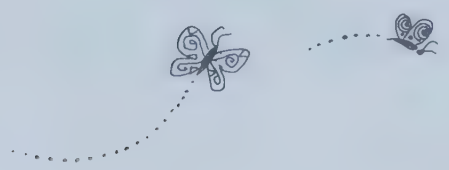
List of Activity Material (for the entire year)

The teacher should read through the respective activity to estimate the quantities of certain materials.

- Map of your state (Geographical and political)
- Map of India (Showing states)
- District atlas/road atlas
- Geographical map of the village/taluka
- Map of India showing Rock types
- Watch/stopwatch
- Binoculars (3)
- Magnifying glasses minimum (3)
- Projector
- Measuring tape or meter scale for measuring (3)
- Chart papers or papers
- Blank pages from old notebooks
- Pair of Scissors
- Empty Vessel
- Water
- Bottle or vessel measuring 1 litre
- Bucket
- Safety pins (52)
- Twine rope/thread (2 bundles of 30 meters each)
- Old newspaper
- Bucket filled with water
- Empty bucket
- Small vessel
- Large vessel
- Coloured Chalks - pencils
- Colours
- Ruler
- Paint brushes
- Glue/library paste (wheat flour + water)
- Fevicol
- Thread
- Twine rope
- Chits for the activity on 'Food Web and Food Chain'
- 4 Plastic bottles of 1 or 2 litres (1, if 4 not available)
- Samples of soil (sand, clay, rough soil, farm soil)
- Dry garbage (paper, thermocol, plastic bags, bags of various eatables, cardboards, various bottles, rags, etc.)
- A4 papers (one for each student in the class)
- Samples of soil; from 3 to 5 different locations in the village -1 kg each
  - Stream / riverside soil
  - Farm soil
  - Soil from the school campus
  - Soil from the forest, wasteland
- Printouts of the images/maps given at the reference website link
- Keep the subtitles on while watching the videos from the reference material
- Teachers should ensure that students carry their notebooks, pens, pencils when required for the activities

Note for the drawing teacher - the subject teacher should get the illustrations sketched from the drawing teacher as required on the board before the period starts or drawn on large chart paper with a mount board support and kept in the school permanently for the following activities -

- Story of a Stream
- Sources of Energy
- Birds
- Story Telling
- Reptiles
- Types of Pollution and their Effects



Activities

1 Tree Calendar

Outdoor

Unit

Plants

Activity Duration

1 hour

Activity Month

June

Method

Field Visit, self-study

Material

Chart paper, notebook, writing material, crayons, pencils

Instructions for Teachers

- Trees go through changes according to the seasons. Shedding of leaves in autumn, budding of leaves in spring, blooming of flowers and fruiting in a specific season.
- Teachers should familiarise themselves with all the trees in the vicinity.
- Reference books :
  - Jungle Trees of Central India: A Field Guide for Tree Spotters – Pradip Krishen

Activity

- Make groups of 4-5 students each.
- Ask every group to choose 3 trees from the campus or surroundings.
- Ask the students to observe the trees all year long.
- The students should fill up the table given below from their observations once a month. Draw the table below on the blackboard the first time to familiarise the students with the procedure.
- In the classroom, discuss the changes that a tree goes through in a rhythmic manner, such as budding of leaves, flowering and fruiting, change in the colour of leaves, shedding of the leaves, birds and butterflies attracted to the flowers and fruits, presence of nests, etc.
- Take the students around the trees and explain how to observe all the above and allow 15 to 20 minutes for their observation.
- Once the students have noted their observations, provide them with chart papers to document their findings by making a table as shown below. Since every group has been designated three trees, there will be as many chart papers as there are trees.
- The excitement and regularity in continuing such observation and documentation tasks related to field visit can be ensured through a display of these charts in the classroom and frequent discussions. Encourage the use of coloured pencils and crayons to designate various colours of flowers, fruits, and leaves.
- At the end of the academic year, ask the students about the changes seen throughout the year and discuss the seasonality of these changes in the class. This should also help the students understand the difference in the type of changes seen in every tree as per the tabular information collected.
- By the end of the year, organise an exhibition to display these charts for parents.

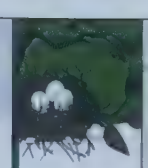
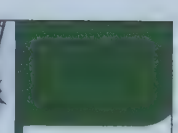
Objectives:

- To make the students observe seasonal variations in trees
- To help the students learn about these rhythmic changes
- To build their observation and documentation skills and to underline the importance of these skills

Tree Calendar

Tree name:

Tree location:

	Leaves (colour, fall, budding)	Flowers (colour, scent, description, birds and butterflies attracted)	Fruits (colour, shape, birds attracted)	Tree shade	 Presence of nests	Other birds, butterflies, insects, animals frequenting the tree	 Other important observations – e.g. Change in the trunk, etc.
January							
February							
March							
⬇							

Additional Information for the Teachers:

- During the summers, some deciduous trees lose all their leaves, and then bloom, e.g. Katesavar (*Bombax ceiba*), Pangara (*Erythrina variegata*), Palash (*Butea monosperma*).
- The evergreen trees never lose all their leaves completely, but they shed some leaves throughout the year. E.g. Mango, Jamun.
- The new leaves of the trees may have bright beautiful colours – some shoots are light green whereas some are reddish or crimson in colour, e.g. SitaAshok (*Saraca indica*), Kusum (*Schleisera oleosa*).
- Some trees blossom 2-3 times a year whereas some only flower once annually.
- Coniferous trees are found in the Himalayas. They have needle - shaped leaves and bear woody cones with seeds attached, e.g. Deodar *(Cedrus deodara)*.
- Mangrove trees near coasts have special adaptation features - prop roots and breathing roots to survive in the mudflats, e.g. Sundari (*Heritiera littoralis*).

2 Map Reading

Indoor

Unit

Settlement

Activity Duration

2 hours

Activity Month

June

Method

Discussion

Material

District Atlas / Road Atlas, state map showing districts and India map showing states, chart paper, pen, colour pencils, pencils, colours, ruler. (3 sets of map as per the number of the students in class)

Instructions for Teachers

- As this activity is to be done in groups, take help of volunteers. Provide clear instructions to them before the commencement of the activity.
- Make two or more groups if the number of the students is high.
- Towards the end of the activity, a village or city map has to be drawn by the teacher with active involvement of the students. Teachers should prepare accordingly.

Activity

- Make the students sit in a semicircle and display a **district road atlas/map** before them.
- First ask the students to find the four main directions on the map. Show the symbol or sign which indicates "North" on map and tell them that it is seen on every map.
- Then with reference to the classroom, ask them to find out the East direction and then the North direction. Then place the atlas / map aligning the North of map to the actual North of the classroom. Then, ask the students to make four chits for the four directions and place them on the map on four sides.
- Ask the students to locate their village/town/city on the map. Encourage the students by asking them questions like which **village is to the North and which village is to the South.** Ask them to see if there are any rivers or national highways passing through the village/ town/city area.
- After this ask them to find out the **talukas** to the North, South, East and West of their village/town/city and help them locate other elements like a river or a mountain range or a forest around.
- Now get the state map to the table and ask them to observe the talukas and districts surrounding their district. Discuss about their findings and the symbols used.
- To get the students habituated to reading maps, ask them the following questions by using the **map of India** -
  - From where do the apples come to the markets? Kashmir. Where is Kashmir? Ask them to locate Kashmir on the map and find out how far it is using the 'scale' on the map.
  - If the school is in Central India - where do we get Alphonso mangoes and cashew nuts from? The Konkan coast. In which direction is it located? Which places - fall between our village / town and Konkan? Is there any sign showing Ghats?
  - Where are metro cities like Mumbai, Bengaluru, Chennai, Delhi, and Kolkata located with respect to your village / town / city? How can one go there? Is there any railway line? Are there any railway stations enroute?
  - Can the students locate any tourist spots on the map?
- Ask the students to make a list of all the elements and symbols seen on the map. Ask them to see the 'key' to understand the references. These will include roads, taluka borders, river, settlement, rail route, etc.
- Teachers should discuss different elements of the map with the students and explain how it becomes easier to make maps using symbols - similarly inform them that there will be other such projects in the future using similar maps.

Objectives:

- To help the students learn to read a map, various symbols used in it and what do the symbols indicate
- To instil a sense of direction, map reading skills, understanding scales used on the map, etc
- To Help them get an orientation of the time, place, and directions

- The teacher and the students can then prepare the schematic village / town / city map together on a chart paper with pencil and colours. This map should include natural and man-made elements like hills, forest, river, lake, school, settlements. For big towns and cities, include only the main elements or whatever elements are there in the school premises or surroundings.

3 Sources of Water

Indoor

Unit

Water

Activity Duration

1 hour

Activity Month

June

Method

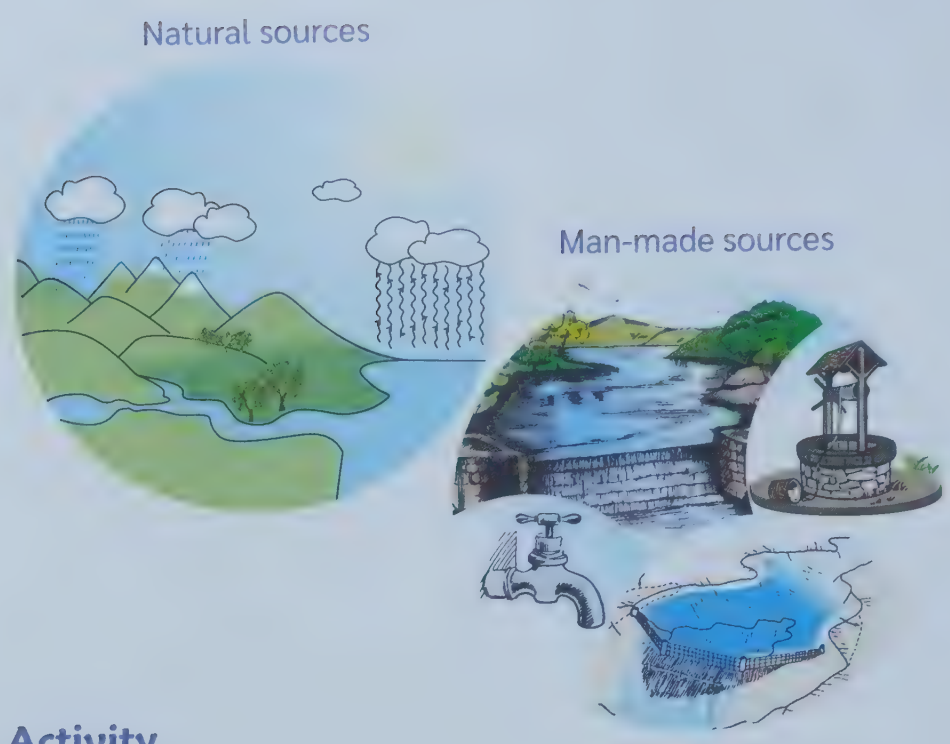
Discussion / Group Study

Material

Notebook, pen, geographical map of the village / taluka / tehsil

Instructions for Teachers

- Obtain all the information about the sources of water in and around the campus, such as rivers, streams, creeks, along with their names, origin, and current form.
- The teachers should familiarize themselves with the natural sources (e.g. rivers, streams, lakes, springs, etc.) as well as the man-made sources (e.g. wells, dams, hand pumps, etc.)
- "The source" could be a new term or concept for the students so use simple terminology such as "places where water is available."



Activity

- Ask the students to name the sources of water in their homes and in the school followed by the sources of water in the village/town /city. Enlist all the sources discussed on the black board.
- From the list ask the students to identify the source type viz. 1) Natural and 2) Manmade sources and to note them down as per their type.
- Ask them the following simple questions -
  - What is the origin of the water in the sources such as hand pump, well, lakes, dam, etc.?
  - While discussing the topic ask the students if a river, spring, pond/lake or sea is present near the village/town/ city.
  - Ask the students to sit in a semi-circle and place a map of the taluka (if available) in the center and locate their village / town on the map.
  - Similarly ask them to locate the rivers, lakes and streams in their vicinity and write their names in the notebook.
  - Ask them to find out the 'direction of flow' of the river/stream from the map.
  - If time permits, ask the students to draw a map of the water sources in the surroundings that were discussed. Ask them to write which sources are polluted and which are non-polluted.
  - If the map is not available, the teacher can conduct a discussion on the above points in detail.

Objectives:

- To help students become aware of the sources of water in and around the campus/village/ town/ city
- To help students learn about transport of water from the source to its place of use

4 Water Cycle

Indoor

Unit

Water

Activity Duration

1 hour

Activity Month

July

Method

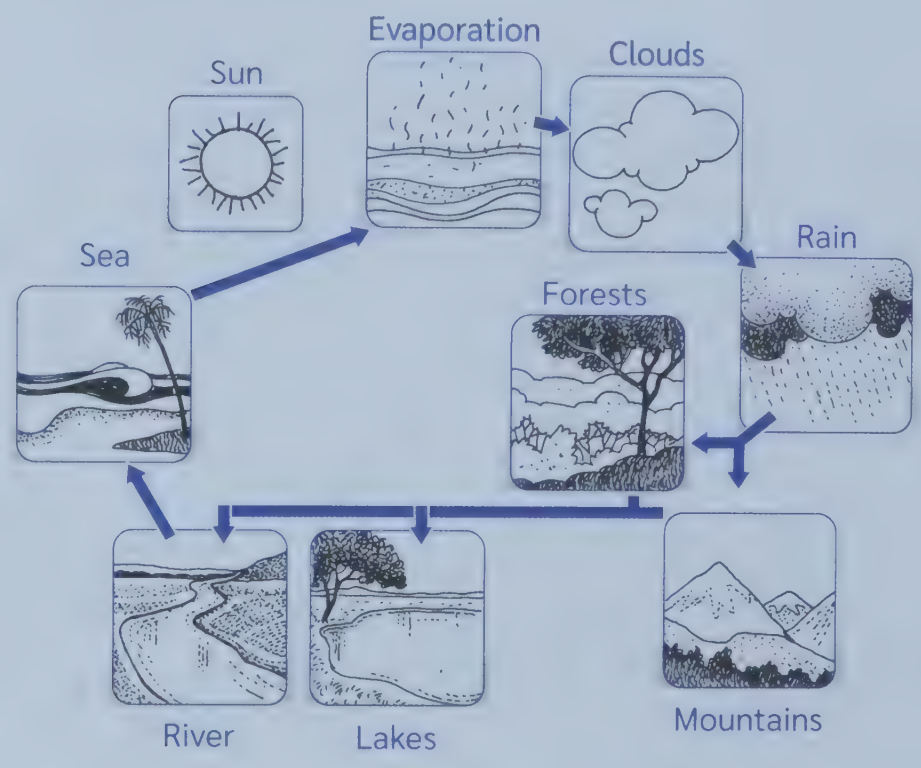
Representation through a series of drawings, learning in groups

Material

A5 size chart papers or half A4 size - one each, blank pages from old used notebooks, pencil, colours, scissors

Activity

- Begin the class with a discussion on the 'water cycle' with the students and list down the key elements on the board. The teacher should then tell the students that they must draw pictures of these key elements and create a water cycle diagram using their drawings.
- Help the students to create a water cycle diagram as shown below.
- For this activity, split the class in groups of ten children each and distribute the chart papers to them.



- Each student in each group must draw a picture of one key element listed on the board. Let the students decide among themselves who would draw which element.
- Make name tags for each picture and arrows to join the pictures together to make a cycle diagram. The students can use blank pages from old notebooks to make the tags and the arrows.
- Once the students finish their drawings, ask them whether they can find links between any of the elements and place them in order may be on the floor. Through discussion help the students understand the links between each of the elements, and then help them create the water cycle diagrams.
- Encourage the students to express their views and understanding about the water cycle diagram. Observe their understanding and guide them accordingly.
- After all the groups complete the task of arranging the pictures in the correct order, help them paste the complete cycle diagram on the wall.

Objectives:

- To help the students understand the water cycle
- To help students understand how water moves through the atmosphere in a cyclical manner, due to which we get freshwater every year

5 Visit to a Stream (1)

Unit

Ecosystem

Activity Duration

2 hours

Activity Month

July

Method

Field visit, observation, group learning

Material

Notebook, pen, watch (stopwatch, if available), binoculars (if available), a big ball of crumpled paper, measuring tape / meter scale for measuring distances, map prepared during the map reading activity

Instructions for Teachers

- Identify a nearby stream and names of plants, animals and birds generally found on its banks before taking the class on field visit.
- Since there are chances of encountering moss, serpents, and insects near the stream, ask the students to take the necessary care while exploring the surroundings.
- The chances of sighting birds and animals near the stream are higher in the mornings and the evenings. Therefore, plan the trip before 10 am or after 4 pm.
- Please take all the necessary care and precautions while conducting this activity in mountain ranges or near larger streams, where the speed of the water or the water levels could be dangerous.
- This activity is to be conducted thrice a year, so that the students will be able to observe the seasonal changes in the stream.
- Refer to the website link provided for additional information.

Objectives:

- To get familiarised with a stream in the neighbourhood
- To introduce the students to the characteristics of a stream in the rainy season

Activity

- Use the map prepared during the map reading activity. If the map does not show a stream, then draw the stream, its location, flow, and direction of the stream on the map with the help of the students.
- Then, take the students to the stream and let them sit on the bank. Ask them to observe the stream and its surroundings.
- Ask the students to observe water, banks of the stream, vegetation around them (all types of plants), birds etc. for 10-15 minutes. Ask them to maintain silence and to listen attentively to all the varied calls and songs of the birds.
- Then start a discussion by asking some leading questions, like -
  - What is the colour of the water?
  - What is the speed of the water - is it flowing rapidly or slowly?
  - Is the water level swollen up to the banks of the stream or below the banks?
  - Is any vegetation visible on the banks of the stream, in the immediate surroundings or inside the stream?
  - Do they see anybody using the water from the stream?
  - Do they see anybody washing clothes or vehicles in it?
  - Do they see anybody bathing in it?
  - Can they see garbage in the water or on the banks of the stream?
  - Do they think that the fallen leaves lying on the banks of the stream are garbage?
  - Do they think the plastic bags or other objects thrown around are garbage?
  - Has the colour of the water turned blackish or muddy because of any activity?
  - Is there any lather on the water?
  - Can they sight any birds, animals, insects in the water, on the banks of the stream and in the surrounding vegetation? Do they know their names?
- After such a discussion, ask the students to note down their observations in their notebooks. Ensure that the students document their observations about all the following aspects: colour of the water, speed of the water, water level, plants, birds, animals, insects in the water and on the banks of the stream, use of the water, pollution in the water.
- Then ask the students to observe the soil on the banks of the stream. Its colour, feel and touch, proportion of pebbles/sand in it. Ask them to make a note of these findings in their notebooks.

- After the students have finished documenting all the observations, ask one or two students to read their observations aloud. Also discuss the changes that occur in the stream and its surroundings at the beginning of the rainy season. For example, a lot of vegetation flourishes, the speed of the water rises, etc. Make it a point to deliberate upon the source and the journey of the stream.
- Thereafter, ask them **to measure the speed of the water** in the following manner:
  - Call 3 students for measuring the flow of the water and ask the other students to stand near the bank of the stream.
  - Position two students on the same bank at a distance of 20 meters from each other (use a meter tape to measure the distance). A third student should be positioned between these two students, with a stopwatch / watch to calculate the time.
  - The student who is upstream has to throw a ball of crumpled paper into the stream and call out loudly 'paper thrown' which will alert the student in charge of counting time and he/she will start the stopwatch/note the starting time on the watch.
  - The student who is positioned downstream has to notify once this crumpled ball of paper reaches him by loudly shouting 'paper reached' which will alert the student in charge of counting time, and he/she will stop the stopwatch / note the end time in the watch.
  - Ask them to jot down the time required for the paper ball to travel the distance of 20 meters in their notebook. Now, using the time taken by the ball to cover 20 meters the students can mathematically calculate the distance covered by the paper ball in 1 second. This would be the speed of the water in meter per second and has to be noted by the students in their notebooks.
  - If possible, the same activity of calculating the speed of the water should be repeated in other seasons - towards the end of the monsoons, in winter and in summer and the seasonal water speed should be compared.

Additional Information for the Teachers

- Common trees growing on the banks of the streams – Pongam tree (*Pongamia pinnata*), Arjun tree (*Terminalia arjuna*), Goolar or Cluster fig (*Ficus racemosa*), Jamun or Java Plum (*Syzygium cumini*), Indian Willow (*Salix tetrasperma*), etc.
- Common insects spotted at the banks of the streams or in the water- water beetle, water skater, dragonfly, butterflies, water striders, damselfly etc.
- Common birds sighted on the banks of the streams - kingfisher, pied kingfisher, red wattled lapwing, white breasted waterhen, jacanas, egrets, Indian pond heron, cormorants, storks etc.
- Common animals sighted on the banks of the streams- frogs, tadpoles, Checkered Keelback, etc.
- Regions like the Himalayas or a desert would have different diversity, teachers from those regions can elaborate more on that.

Important Note: Refer to the table given in the activity no. 20 and use it to document the observations for the stream for the month of July.

6 Story of a Stream

Indoor

Unit

Ecosystem

Activity Duration

1 hour

Activity Month

July

Method

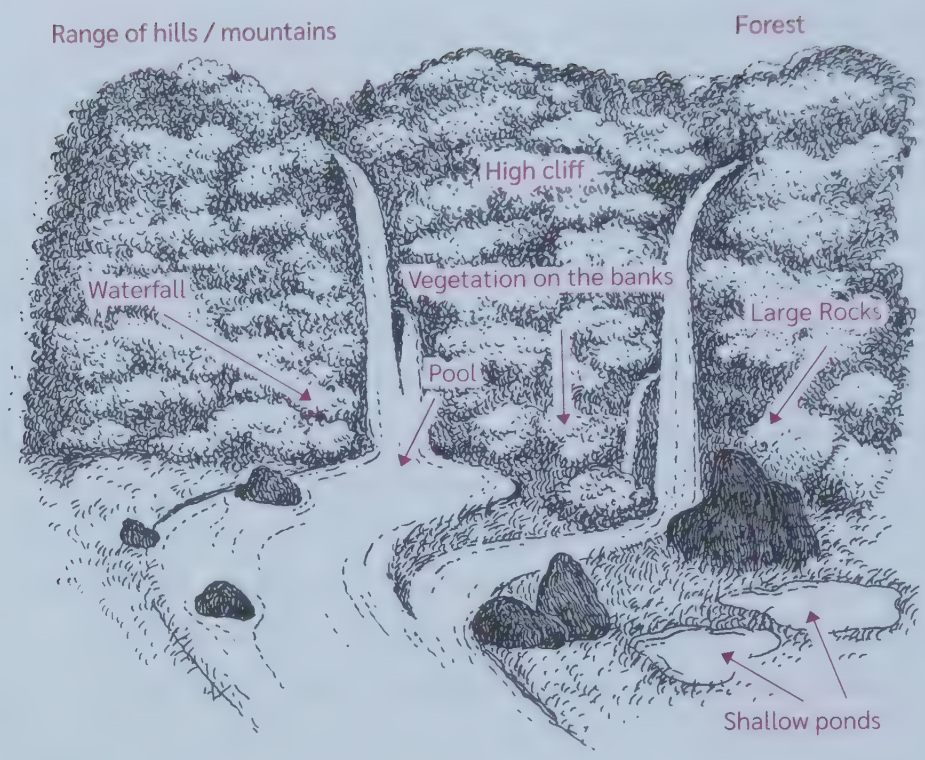
Discussion, learning through an illustration

Material

Use the illustration provided for this activity

Instructions for Teachers

- This activity must be conducted with the help of the given illustration. Either the teacher can draw the illustration on the board or ask the drawing teacher to do so. Carefully read and understand the "Additional Information for the Teachers" given on the next page in order to explain the importance of each component of the ecosystem to the students.



Activity

- Explain the journey of a stream with the help of the illustration and the reference information to the students.
- Engage the students in a conversation about the illustration drawn on the board and ask them what they see and understand from it.
- Ask them leading questions such as - a) Do they know about the local mountain ranges or hills? b) Where does the stream originate? c) Do they see a forest there? d) Have they seen a waterfall? e) Which bushes or trees have they seen on the banks of a stream? f) Have they seen frogs, fishes etc. in the stream? g) Have they observed the small pool where the water falls? etc.
- Motivate the students to find out things and learn on their own. Then, familiarise the students with the unfamiliar terms such as lake, pool, pond, potholes etc. and give more information on the following terms used in the illustration:
  - Mountain Ranges (e.g., Sahyadri, Satpuda, Vindhya, Aravallis, Himalayas, Garo Hills or any other range near the village / town / city)
  - Waterfall from high cliffs
  - Pools formed under the waterfall
  - Shallow ponds near the banks of the stream
  - Smaller waterfalls and rapid water stream
  - Large rocks
  - Potholes
  - The bushes and trees on the banks of the stream

Objectives:

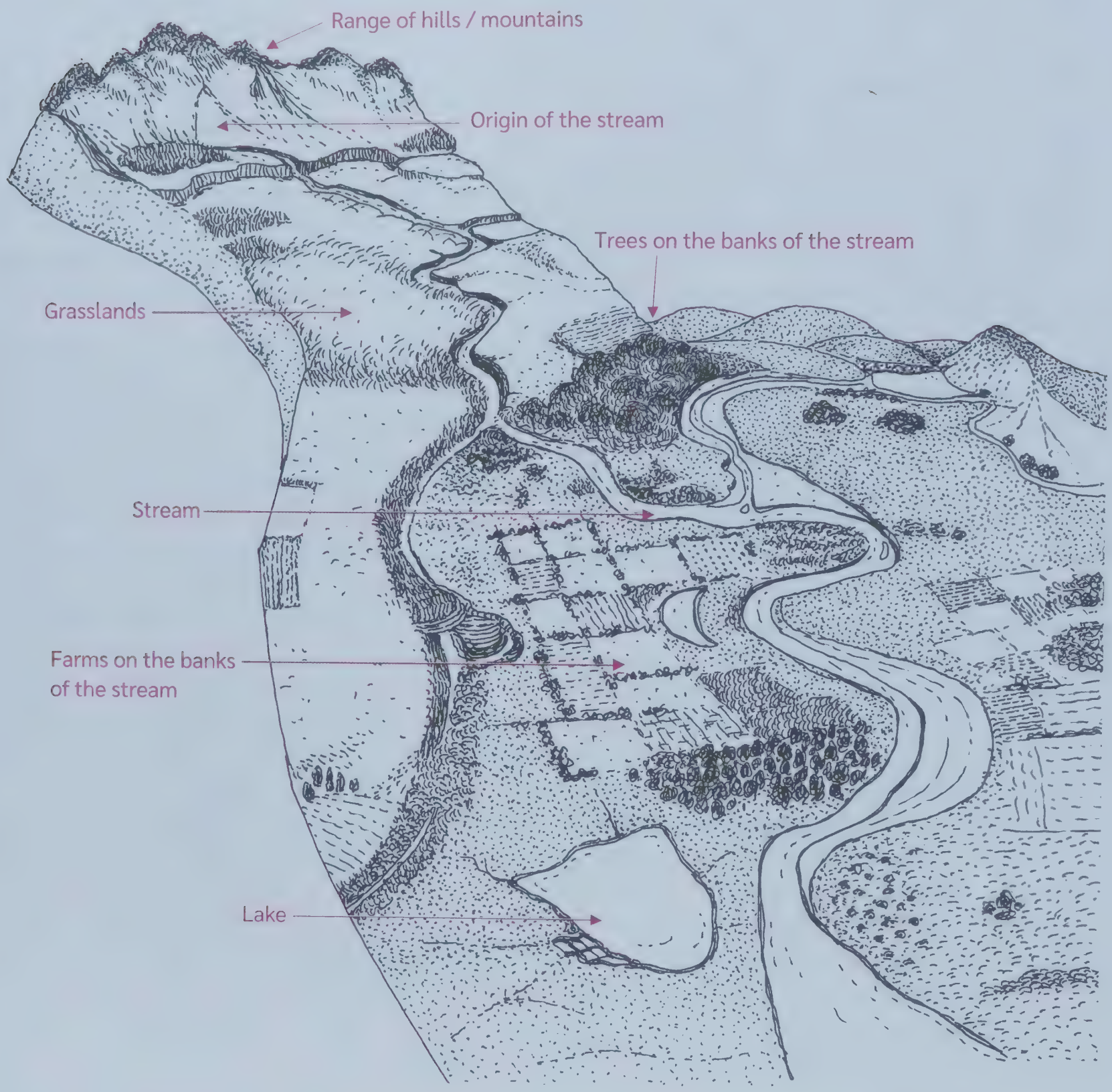
- To help the students understand the journey of a stream from its origin to its confluence with the river
- To educate the students about the changes in the stream as well as its surroundings during this journey

Additional Information for the Teachers

'The changes in the stream from its origin to its confluence with the river'-

- A mountain range- explain about the local mountain ranges in your region in brief. (E.g.-The Sahyadri Range starts from Gujrat and extends up to Kerala. It is 1600 Kms long. Show the picture of the mountain range or show its location on a map.) Also explain that the hills and mountains are often covered with deciduous or evergreen forests. Therefore, natural springs can be found in such regions, which are a perennial source of water. However, nowadays, the increasing deforestation has led to depletion of the water sources and erosion of soil on a large scale. This in turn is affecting human beings as well.
- If available, show the photographs of the hill ranges taken in monsoon so that the students can see the forests, plateaus and cliffs etc.
- Water from many springs meets the stream. When the stream falls from a cliff, it is called a waterfall. While falling, the oxygen in the air mixes with the water and oxygen content in the water increases. This in turn helps the aquatic organisms and plants such as fishes, insects, algae, and shrubs in the water.
- The dried leaves from the trees on the banks of the stream fall in the water and increase its nutrient content. It becomes food for the plants, animals, insects, and fishes living in the water. The life in the stream thrives on this food and on each other.
- When the water falls from a height, a pool is formed at the place of its impact on the ground. The constant impact of the water makes the pool deeper. Such pools are particularly useful for animals, birds, and insects specific to that ecosystem.
- The journey of the stream continues in the direction of the slope of the terrain. During this journey small ponds are formed on the banks of the stream. Some of these are perennial and some are seasonal. This depends on the type of springs forming the stream. The level of water in the stream rises and falls as per the season, and accordingly the seasonal plants grow on the banks of the stream. Their flowers attract butterflies and honeybees.
- The rapid current in the stream causes erosion of the rocks in the bed and potholes are formed. Some of the potholes are very deep.
- When the stream runs down a hill, loose rocks come down with the flow. The water crashes against these rocks, again resulting in the atmospheric oxygen dissolving in the water.
- The more the dissolved oxygen in the water the better is its quality. The plant and animal life in the water thrives on it. Water with adequate oxygen level is considered as clean and potable.
- Certain trees, and shrubs that grow particularly on the banks of the stream perform an important function of preventing soil erosion. Their roots hold the soil preventing it from loosening and flowing off, retaining moisture and providing a habitat to many birds, animals and other smaller plants.
- The water in the stream flows into a river. The human life in the small and large settlements along the riverbanks depends and thrives on this water. Therefore, for all purposes, it is necessary that we preserve the purity of these streams and rivers and not pollute them.

Source and the journey of a stream



Important note:

- Ensure that the students fill the tree calendar charts from time to time and interact with them about it for 5 minutes.
- Read 'preparatory activity' from the next session and instruct the students to measure their daily water usage accordingly.

7 Daily Water Usage

Indoor

Unit

Water

Activity Duration

1 hour

Activity Month

July

Method

Activity, Discussions, Self-Study

Material

A glass, one litre bottle or a can, bucket, and water

Preparatory Activity

Prior to taking up this activity in the school, ask the students to measure the quantity of water used for each task or routine of the day in their homes. The students can measure the quantity needed for each task with the help of a glass, a mug, or a bucket. For example, for brushing teeth - 1 mug, for bathing - 1 Bucket, etc. The students will know the quantity of water consumed for the household activities. Ask a few students to bring their measuring vessel (for example a glass or a mug) to the school.

Instructions for Teachers

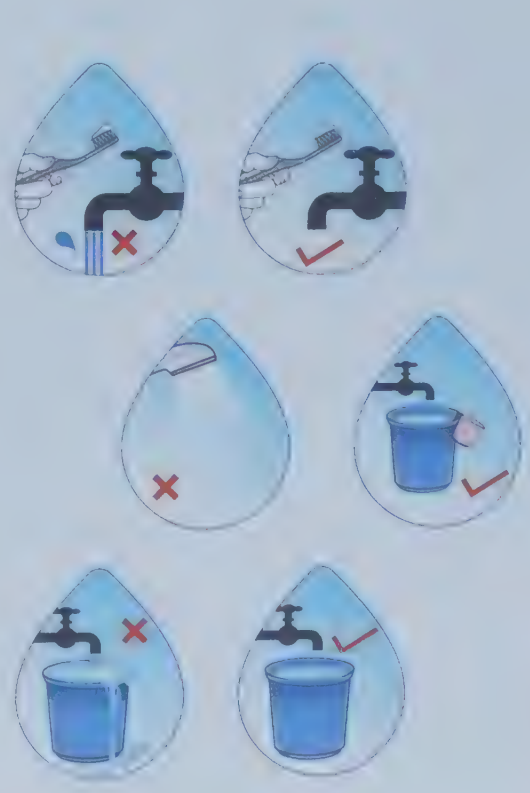
- Before conducting this activity in the class, try it at your own home by measuring the quantity of water used for different tasks in the daily routine. This will help in conducting the activity effectively in the school with the students.
- Share your findings about the daily water usage with the class.
- This activity can be omitted in the areas where there is acute shortage of water.

Objectives:

To make the students aware about the daily household water usage

Activity

- Start the activity by asking the students about how they measured the quantity of water in each activity, the vessels they used for measuring and how long did it take to measure, etc.
- Ask the students about the various household tasks that require water and write them on the blackboard. E.g. 1) Brushing teeth, 2) Bathing, 3) Washing clothes, 4) Washing utensils etc.
- Ask the students to fill a one liter bottle with the different measuring vessels that they have used at home for this activity, and then show how many bottles are required to fill one bucket. Ask 3 to 4 students to do this with different vessels. This will give the students an idea about the daily water usage in liters.
- Ask a student to write the quantity of water used for each household task measured through a measuring vessel or a glass or a mug on the board. Convert all the quantities into liters. Now add up all the quantities which would give the total liters of water used in their homes during the day.
- Ask the students to make a similar list in their notebooks and calculate the quantity of water used daily for their homes.
- Now, ask the students, that along with this daily water usage, how much water is used from the common water sources such as public wells, rivers, lakes, sea, etc. and also list down those common purposes.



8 Observing Aquatic Life

Outdoor

Unit

Animals

Activity Duration

1 hour

Activity Month

July

Method

Field visit, observation, writing, group-learning

Material

Notebook, pen, pencil, colours / crayons, magnifying glass, binoculars

Instructions for Teachers

- Identify a small pond, or a lake, or a riverside/stream side puddle in the vicinity of the school campus to conduct this activity, beforehand. (Choose a 'well' if no other option is available.)
- Study all the birds, insects, amphibians, animals that are seen near water and identify their names beforehand.
- If field guides for plants / insects / frogs / snakes or other animals are available in the school library, bring them in the class for the activity.
- Ensure that students take all the precautions and are safe while observing the well / pond.

Activity

- Take the students to a lake/puddle/ well/ pond near the school.
- If there are many small puddles / ponds, make groups of 3-4 students each and ask them to sit near each of the puddles / ponds.
- If it is a well, ask the students to stand around the well and observe.
- Ask the students to observe the well / lake / puddle, its shores and surrounding area. E. g. if it is a well, ask them what they see on the rocks inside and outside of the well, in the water, etc. and if it is a puddle / pond, then ask them what they see in the water and surroundings and near the boundary of the water body.
- Give the students 15 to 20 minutes to observe the birds, animals, insects, plants, etc. around the water and on its shores. They can use binoculars to observe life within the well.
- Now ask the students to note down the names of the **animals / insects / birds / plants/ algae** seen in their notebooks.
- If the names of certain insects or plants are not known, ask them to write the description and draw a sketch.
- Read the notes or observations from students' notebooks and discuss. E. g.
  - Where was a particular insect / animal in the puddle? On the bank? In the water?
  - What was the insect / animal / bird doing? Was it flying, swimming, eating?
  - What was it eating?
  - How many types of animals were seen in all?
- Give the field guides available in the library to students and ask them to identify the animals / plants that they have observed at the puddle.

Objectives:

- To help the students observe animals in and around a water body and understand their interdependence in the ecosystem
- To improve the observation skills of the students

Aquatic Animals

Water Beetle

Water Skater

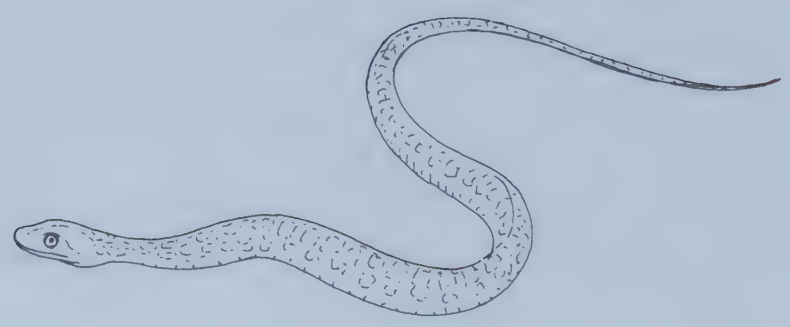
Dragonfly

Frog

Damselfly

Beetle

Fish



Water Snake

9 Types of Plants

Outdoor

Unit

Plants

Activity Duration

2 hours

Activity Month

August

Method

Discussion, group learning

Material

Notebook, pen, pencil, scale

Instructions for Teachers

- Study different types of plants (trees, shrubs, climbers, creepers, grasses, herbs, ferns, orchids, moss) and their characteristics beforehand.
- In the discussion with the students, tell them about certain climbers in forests whose trunks grow as large and as strong as big trees. (For example, in the Sahyadri (Western Ghats), climbers such as *Entada rheedeii* (Garambi), *Acacia concinna* (Shikekai), *Diploclisia glaucescens* (Watoli) etc. can be found. Whereas in areas with low or medium rainfall, climbers like *Combretum latifolium* (Piluki), *Bauhinia vahlii* (Maloo creeper or Kanchanvel), *Butea superba* (Palasvel) can be seen).

Activity

- Ask the students to name the plants and trees that they commonly notice in their surroundings or use at home. (For example, Mango, Jamun, Juhi, Chameli, Tulasi, Durva / Doob, Adulsa, Spiny Barleria, Gulab, Hibiscus, Krishna Kamal, etc.) List the plant names on the board and ask the students to spot the similarities and differences between these plants.
- Encourage the students to categorise these plants and trees based on their forms, shapes, height, etc.
- If the students are unable to categorise the plants, ask them the following leading questions -
  - Is the plant tall? Does it have a big and strong trunk? If so, it is a **'tree'.**
  - Does the plant grow with the support of another plant? Does it have a weak or flexible trunk? If so, then categorise it as a **'climber.'**
  - A plant that is smaller than a tree (1-2 ft.) but has a strong trunk is a **'shrub.'**
  - Plants growing during the rainy season, closer to the ground, having flexible green stems are **herbs or shrubs.**
  - Explain the characteristics or these different plant types to the students.
- Explain the classification further with more examples and draw the following chart on the board. Ask the students to draw the same chart in their notebooks and fill in the plant names from the list on the board as per their classification.
- Then, ask the students why are the banks of a stream slippery in rainy season? What is the green coloured growth seen on the rocks during the monsoon? If the students answer as 'moss,' then explain that the moss is also a type of plant.
- Thereafter, take the students outside the classroom and ask them to identify the various plant types around.
- After returning to the class, ask the students to complete the chart. Ask them to draw a small diagram of each plant type at the top of the respective column as shown in the following chart.

Tree	Shrub	Climber	Herb	Grass
Mango	Adulsa	Juhi	Tulasi	Lemon grass
Jamun	Tagar/ Chandani/ Crape Jasmine	Chameli	Basil	Turf grass
Palash	Hibiscus	Krishna Kamal	Pudina	Khus grass

Objectives:

To introduce the students to the different types of plants

10 Parts of a Plant

Outdoor

Unit

Plants

Activity Duration

2 hours

Activity Month

August

Method

Discussion, group learning

Material

Notebook, pen, pencil

Instructions for Teachers

- Study about the parts of a plant and their functions in the Science textbook.
- Locate weeds like Congress grass, Tarota (*Cassia tora*), Siam weed (*Chromolaena odorata*) within the school campus.

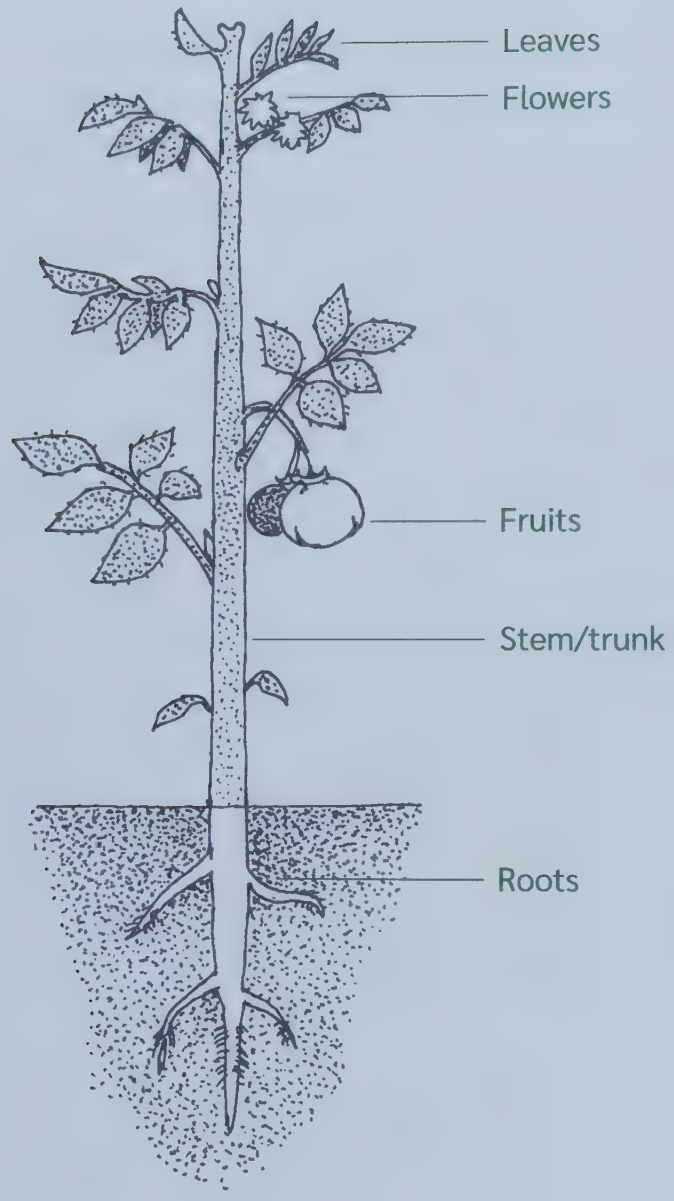
Activity

- Ask the students to sit in a semi-circle outside the classroom, in the school campus / lawn / ground.
- Bring a few saplings of weeds like Congress grass, Tarota or Siam weed with all their parts intact. Distribute the saplings to the students in groups of 4 to 5. Keep one sapling for demonstration. (If none of the weeds are available, a sapling of Marigold or any common sapling in the garden can be used).
- Inform the students that they will study various parts of a plant in the activity. Begin with a quick revision of 'the parts of the human body' to establish a similarity. Now, ask the students to identify the parts of a plant by asking leading questions.
- First, ask the students which parts they can observe on their saplings. As the students answer this by naming the parts, take the discussion ahead by introducing each part one by one.
  - **Root** - What is the function of the roots? Do they provide support to the plant / tree? Do the roots absorb water from the soil? Is it only water that they absorb? How? Is it similar to the way we drink tender coconut water through a straw?
  - **Stem** - How does the stem feel when touched? Is it hard? Ask the students to compare the trunk of a grown tree with the stem of the sapling and discuss the differences. Ask them how the nutrients absorbed by the roots reach the top of the tree.
  - **Leaves** - How do the leaves look? Ask the students to observe and describe their colour, feel and touch, smell, etc. Are the leaves close to each other / thickly placed or spaced out? Like human beings eat food for nourishment, how do plants prepare and eat their food? Discuss that the leaves prepare food with the help of Sunlight and survive.
  - **Flowers-fruits** - Are there any flowers or fruits on the sapling? What is their use or function for the plant? How do new plants grow? Have they seen any seeds?
- After studying the parts of a sapling, continue the discussion about large trees in the campus by studying them closely, and observing their parts.

Objectives:

To introduce various parts of a plant and their functions to the students

Parts of a Plant



(This figure is for the teachers)

Important Note: The teacher should ensure that the tree calendar chart is being regularly updated and engage the students in a quick discussion about the same. Clarify any doubts and highlight the importance of the activity.

11 Study of Leaves

Outdoor

Unit

Plants

Activity Duration

2 hours

Activity Month

August

Method

Field work, group discussion

Material

Notebook, pen, pencil, paper, glue / library paste (wheat flour and water)

Instructions for Teachers

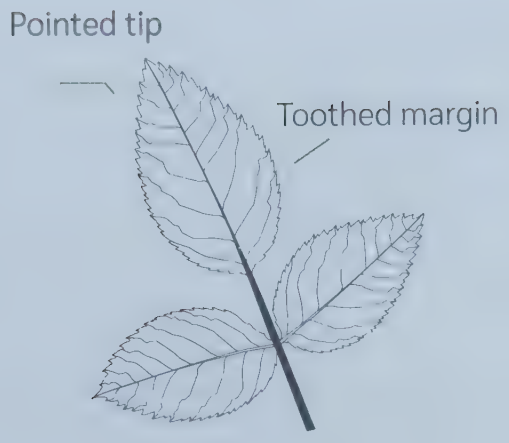
- Read the information about diversity in types of leaves, their characteristics, and functions.
- Check the website link provided for additional information.
- Reference Books:
  - Jungle Trees of Central India: A Field Guide for Tree Spotters - Pradip Krishen

Activity

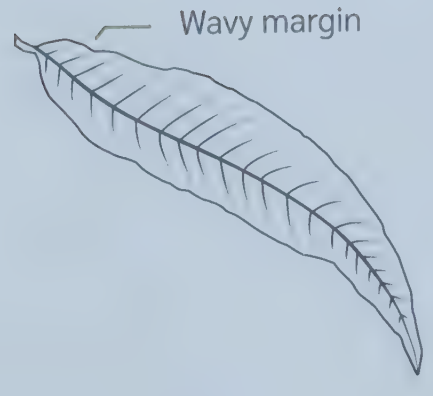
- Make groups of 4 to 5 students.
- Ask each group to collect 10 different types of leaves from the school campus. Give them 5 to 10 minutes for this task. The students are supposed to collect the freshly fallen leaves only and they should not pluck leaves from the plants.
- Now, ask the students to describe 'leaves' by naming various parts of the leaves that they can observe. Note the terms that they use.
- Introduce and explain the terms given below to describe different parts of a leaf by pointing at those parts. Now, ask the students to make a list of these parts and then observe the leaves.
  - Colour
  - Shape of the leaf
  - Leaf margin
  - Tip (apex)
  - Petiole
  - Venation on the leaf
  - Feel or touch
  - Smell of the leaf
- After making the list, discuss each part of the leaf with the students. Help them observe different leaves with leading questions such as, how is the leaf margin? What is the shape of the leaf? etc. Let the students express their observations **in their own words first.** Then, give them multiple choices to help them describe the leaves, for example,
  - What is the type of the leaf margin? (dentate/undulate/ entire or toothed /wavy/smooth).
  - What is the shape of the leaf? (Oblong, linear, ovate, long, rounded).
  - What is the type of tip (apex) of the leaf? (Pointed, rounded, spear-like).
  - What is the type of leaf base? (Rounded corners (truncated), roundish, heart-shaped).
  - How does the leaf feel when touched? (smooth / rough).
  - How does it smell?
- Ask the students to draw a sketch of the leaf in their notebooks and to write the above description with the plant name. The time allotted for this task should be 20 to 25 minutes. (Do not show or draw a sketch on the board.) Then, ask the students to stick a leaf on a paper using glue and write its information next to the leaf. This is how a 'herbarium' is created, which is a data source of dried and labelled plant specimens arranged to allow easy understanding, access, and storage.

Objectives:

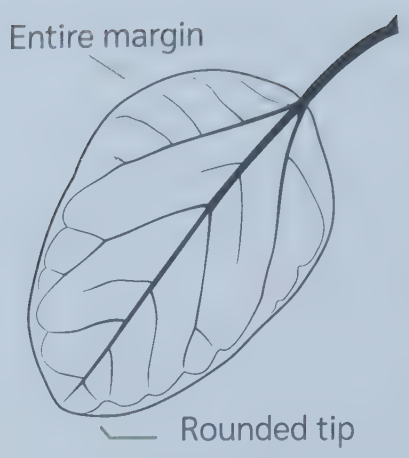
To introduce the students to the diversity in the forms, shapes and sizes of leaves and their characteristics



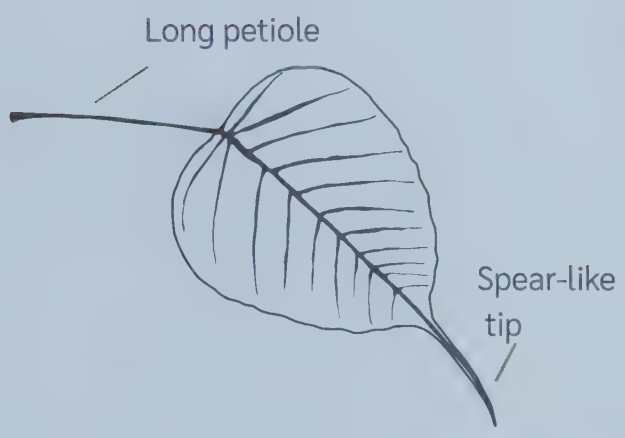
Rose



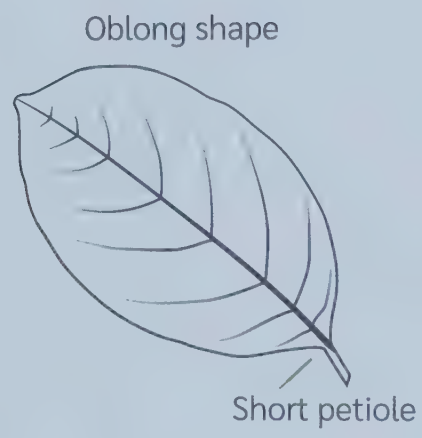
Mango



Banyan



Sacred fig (Peepal)



Jackfruit

Hibiscus

12 Classification of Animals

Indoor

Unit

Animals

Activity Duration

2 hours

Activity Month

August

Method

Discussion, writing, observation, group learning

Material

Notebook, pen, pencil, scale, common objects from the campus (e. g. leaves, flowers, fruits, stones, soil, pencil, chalk etc.)

Instructions for Teachers

Gather information about the animals seen around the school, in the village / town / city neighbourhood and in the nearby villages and districts. Use examples of the animals known to the students or the ones that they commonly see in the surroundings to facilitate the understanding of the topic.

Activity

- Place the objects collected such as leaves, flowers, fruits, stones, soil, pencil, chalk etc. on the table and ask the students to classify the objects in groups like 'living', 'non-living' and other categories that they can think of.
- Then ask the students to name various animals that they have seen in their surroundings or those that they know about.
- Make a general list of the animals on the board such as dog, cat, bull, horse, hen, rat, hare, snake, frog, lizard, mosquito, ant, etc. and those named by the students.
- Ask the students to think of categories that these animals can be grouped into. Hint them to look at the similarities and differences in the listed animals. For example, animals found in the forest (wild animals), domestic animals etc.
- Let the students express themselves freely and come up with their own classification categories such as animals which are dangerous / not dangerous, animals that help in the farm / nuisance to the farm, etc. It is important to let the students discover the various ways to classify the animals. Observe and understand their thought process involved in categorisation.
- After this activity, introduce them to the other methods of classification. Ask leading questions like -
  - Which animals lay eggs, and which do not?
  - Which animals have fur, and which have feathers? Which animals have scales on their body?
  - What does each animal in the list eat? Which animals eat meat, and which do not (carnivorous animals and herbivorous animals)?
- Once the students answer these questions, ask them to make animal classification charts as shown below. They may add their own categories to the charts such as animals with a tail / without a tail, etc. Allow them to add new classification categories.
- Create the charts on the board based on the responses from the students.

ANIMALS ➡

(The classification given below is only an example. Do not copy the charts on the board.)

Wild	Domestic	Terrestrial	Aquatic

Objectives:

To help the students learn about the diversity in the animal kingdom

Herbivores	Carnivores	Laying eggs	Not laying eggs

Animals with fur on their body	Animals with feathers on their body	Animals with scales on their body

- Write the names given by the students on top of the respective category on the board. It is important to let the students formulate the names for the categories that they have used for animal classification. For example, the students may suggest 'land-animals' for the animals living on the land (Terrestrial animals), 'water-animals' for the animals living in the water (aquatic animals), etc.
- Ask the students to write the categories in their notebooks.
- Then, ask the students to write the name of each animal and its classifications in front of the name. For example, Cat - land-animal, domestic, has a tail, has fur, etc.

13 Mammals

Indoor

Unit

Animals

Activity Duration

1 hour

Activity Month

September

Method

Discussion

Material

Notebook, pen

Instructions for Teachers

- Refer to the website link provided for additional information about characteristics of mammals. Share some examples from the reference material with the students to enhance their general knowledge.
- Reference books :
  - Indian Mammals a field guide – Vivek Menon

Activity

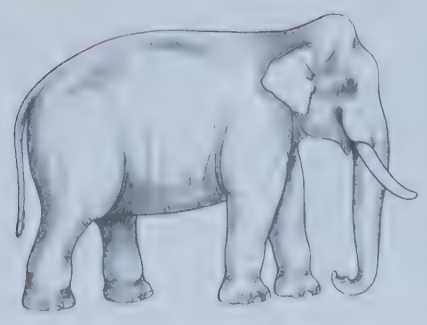
- Make a list of mammals on the board without mentioning the topic as 'mammals.' E.g., monkey, elephant, human, dog, tiger, squirrel etc.
- Ask the students to find the similarities between these animals and write their responses on the board.
- Ask the following questions to guide the students -
  - How many limbs do these animals have?
  - How is their skin?
  - Do these animals lay eggs or give birth to babies?
  - Do their babies feed on their mother's milk?
- Check whether all the characteristics of mammals are covered in the list of questions that are discussed. If not, explain the major characteristics of the mammals. For example, the young babies of these animals feed on their mother's milk. The part of the body that produces milk is called the 'breasts.' The Latin word for breast is 'mamma'. And thus, the animals that have breasts and can produce milk to feed their young ones are called 'mammals'. Then write this as a heading on the board above the list of animal names.
- Ask the students to write the characteristics of the listed mammals in their notebooks.
- Then, ask the students the difference between birds and mammals. Discuss points like - the birds lay eggs, their chicks do not feed on the mother's milk, etc.

Monkey

- Hair / fur on the skin
- 4 limbs
- Breasts

Bat

Elephant



Objectives:

To help students learn about the general characteristics of 'mammals'

14 Insects

Indoor

Unit

Animals

Activity Duration

1 hour

Activity Month

September

Method

Discussion

Material

Notebook, pen

Instructions for Teachers

- Refer to the website link provided for additional information on the insects. Share a few examples with the students to enhance their general knowledge.
- Read the additional information given at the end of the activity.
- Reference books :
  - Insects, M. S. Mani, National Book Trust of India

Activity

- Make a list of insects on the board without writing the topic name as 'Insects' e. g. mosquito, honeybee, butterfly, house fly, dragon fly, bumble bee, ant etc.
- Ask the students to find the differences and similarities between these creatures based on their body parts and write their responses on the board.
- Ask the following questions to guide the students -
  - How many wings do these animals have?
  - How many legs do they have?
  - Do they have the antennae? What is the purpose you think?
- Check whether all the characteristics of the insects have been covered in the list of questions that are discussed. If not, explain the major characteristics to the students. Thereafter, explain to them that this category of animals is called as 'Insects' and write this as the heading on the board above the list.
- Explain characteristics of the insects such as their lifecycle, specific type of eyes, food they eat etc.
- Ask the students to write down the characteristics of insects in their notebooks from the board.
- Tell them that the 'insects' are the largest group of animals in the world and according to the Entomological Society of America (ESA) there are **10 quintillion species of insects on the Earth** of which only 10 lakh are given a name. (Entomology is the study of insects and 10 Quintillion is 10 followed by 18 zeroes).

Mosquito

- 6 Legs
- Compound eyes
- 2 pairs of wings

Honeybee

Butterfly

Objectives:

To understand the general characteristics of a group of invertebrates - 'insects' in brief

Additional Information for Teachers

- The insects play a vital role in the ecosystem. They carry out the **fundamental function of pollination** which is the basis of the plant life. It helps farming as well as the life of plants in the forest.
- Insects have **compound eyes** i.e. thousands of 'mini-eyes' in one big eye. The Images in each mini-eye together form a compound image, which helps the insects capture movements and objects in a wide range of angles and distance around them.
- There is a large diversity in the food that the insects eat. For example -
  - Butterflies, honey bees eat nectar in flowers and pollen grains
  - Grasshoppers eat grass, flowers, grains, seeds, etc.
  - Stick insects eat plant leaves

Important Note: Ensure that the students fill the tree calendar chart from time to time and interact with them about it for 5 minutes.

15 Reptiles

Indoor

Unit

Animals

Activity Duration

1 hour

Activity Month

September

Method

Sketches, discussions

Material

Notebook, pen

Instructions for Teachers

- Refer to the website link provided for additional information on reptiles.
- Share some examples with the students to enhance their general knowledge.
- Sketch a crocodile, snake, tortoise, lizard (or get them sketched from the Arts Teacher) on the blackboard. In case images of these animals are available they can be displayed.
- Also refer to the 'Additional Information for Teachers' given at the end of the activity.

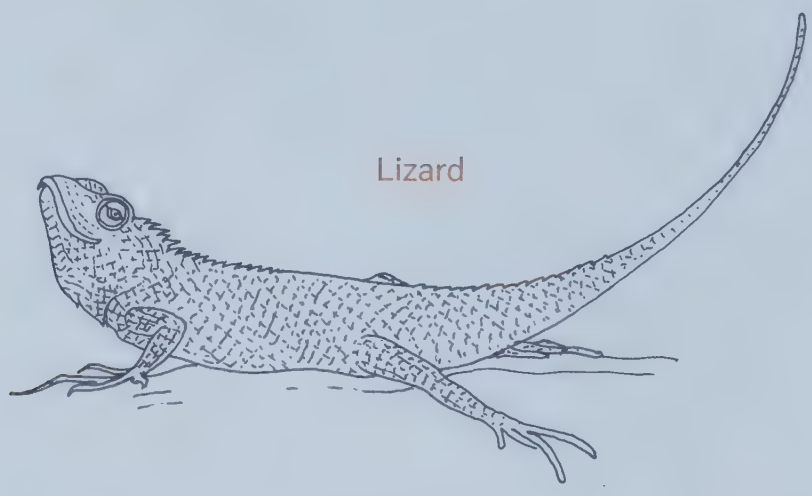
Activity

- Ask the students to observe every organ of the animals from the sketch / photo and discuss the functions of these organs.
- Ask the students to spot differences and similarities between the organs of these animals and channel the discussion towards their purpose.
- Now ask them leading questions to find out differences between a hare and a snake and instruct them about the specific characteristics of reptiles, such as why there are scales on-their body. Do they have a spinal cord? Why do certain reptiles roll their tongue out?

Additional Information for Teachers

Characteristics of Reptiles

- They are cold blooded animals.
- They are vertebrates **(with the spinal cords)**.
- They have scales on their bodies to get a better grip while crawling on the ground.
- They lay eggs. (Exceptions - Russell's Viper, Rock Python)
- They sense their prey and predators using their tongues which help them pickup scent molecules to find the direction. E.g. snakes, while chameleons roll their tongue out to catch the prey.



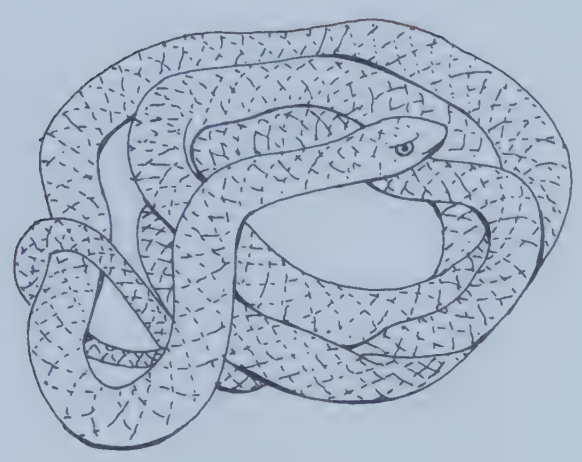
Lizard

Objectives:

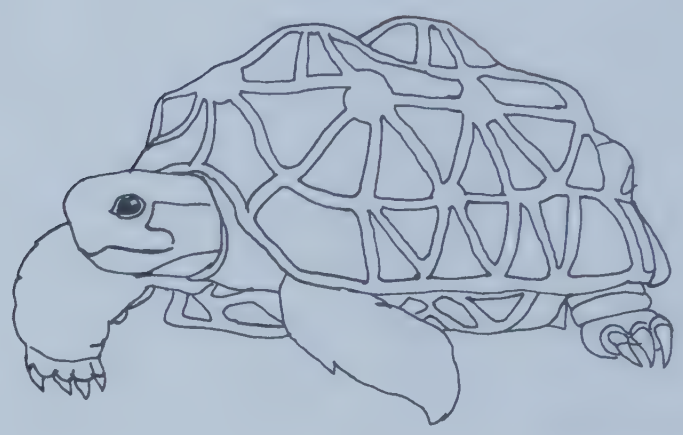
To introduce the students to reptiles and their characteristics

Crocodile

Snake



Tortoise



16 Birds

Indoor

Unit

Animals

Activity Duration

1 hour

Activity Month

September

Method

Diagram, discussion

Material

Notebook, pen

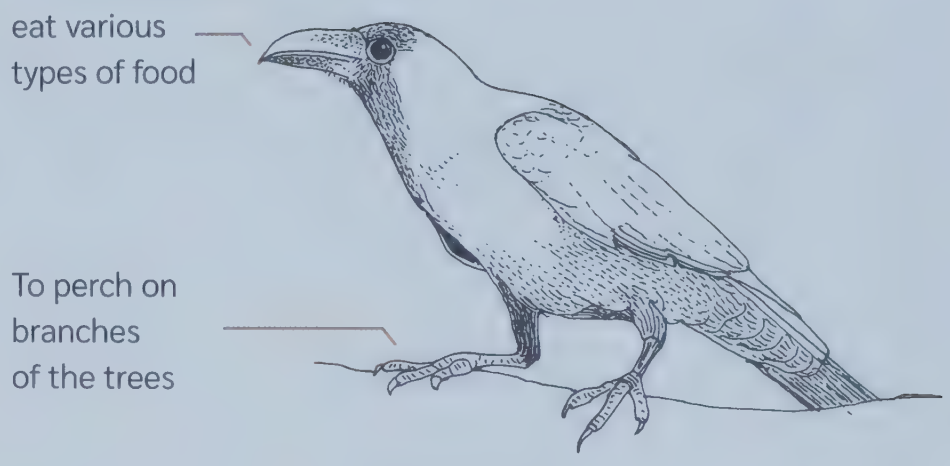
Instructions for Teachers

- Based on the following diagrams, either the teacher or the drawing teacher should sketch the following 10 birds (crow, parrot, eagle, vulture, sunbird, jacanas, cattle egret, crane, duck, (Red wattled) lapwing, woodpecker) on the board before the class begins. In case images of these birds are available, they can be displayed.
- The drawing teacher can also help in **sketching the birds with numbers**, given at the end of the activity.
- Refer to the Website link provided for additional information on Birds.
- Reference books:
  - The book of Indian birds, Salim Ali

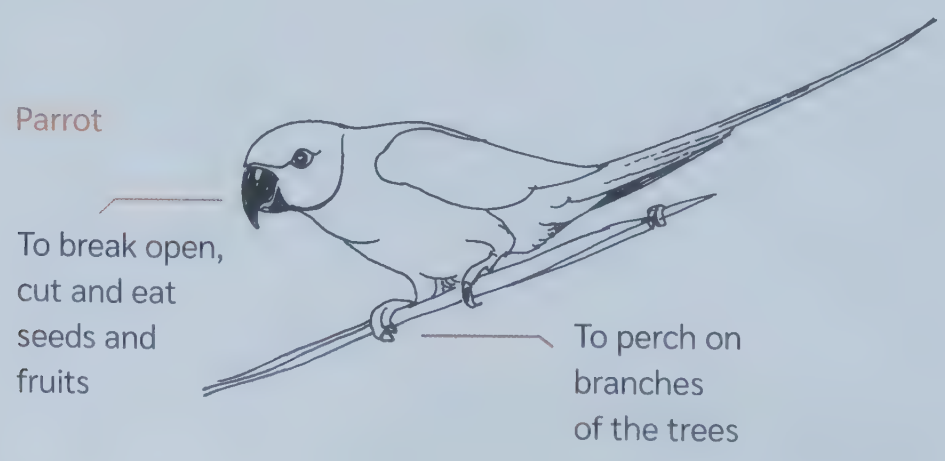
Activity

- Ask the students to observe every organ of the birds from the sketches / images drawn on the board – e.g. eyes, beak, legs, and tail, and discuss the functions of these organs.
- Ask the students to find the similarities and differences between the organs of the birds sketched and discuss reasons behind the differences in the beaks, legs, etc. of each bird. Ask leading questions to introduce them to other organs.
- Thereafter, ask them to sketch the birds with the help of the digits1, 2, 3, 4 as shown in the 'Additional Information' section. Students should attempt to draw various birds in their notebooks.
- Then discuss the differences between the birds and the reptiles.

Crow



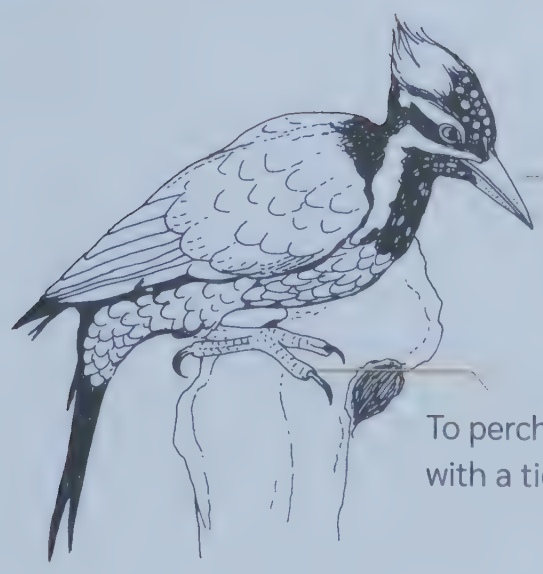
Parrot



Objectives:

To introduce the students to birds and their characteristics

Woodpecker



To peck a hole on the tree bark for making nest and to eat insects hidden in the bark

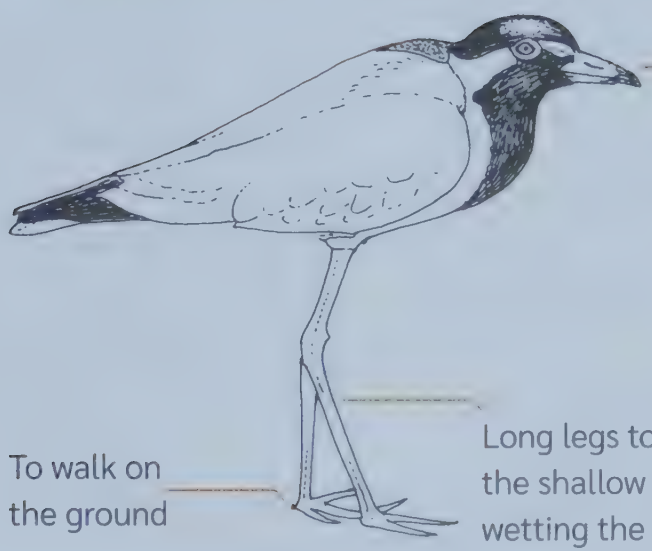
To perch on the tree bark with a tight grip

Eagle

To shred and tear meat of the prey

To hold on to the prey

Red Wattled Lapwing



To easily pick up/hunt for insects and worms in the water

To walk on the ground

Long legs to wade through the shallow waters without wetting the legs

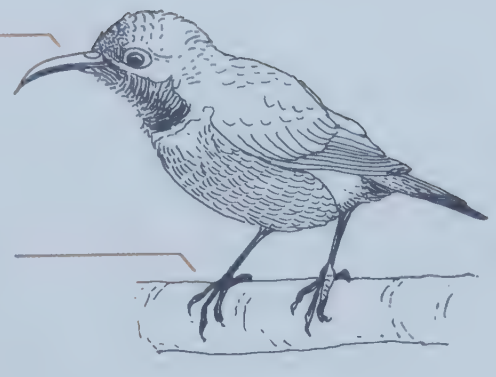
Vulture

To shred and tear the meat and cut the bones of the carcass

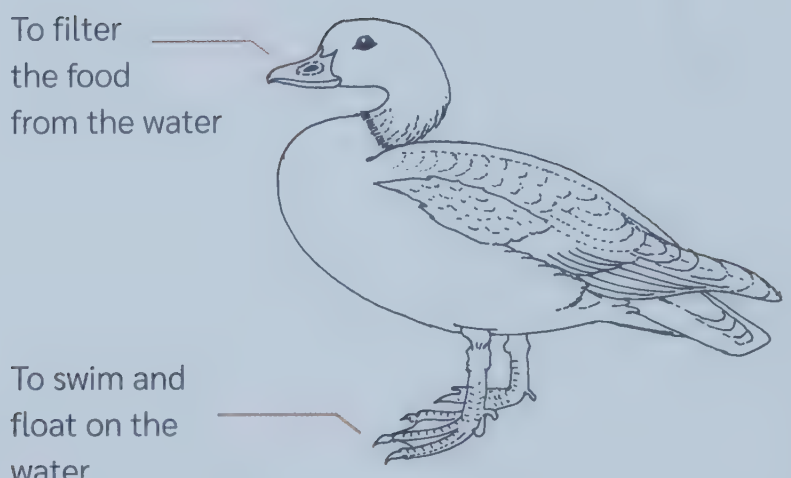
Long and feather-less neck for swiftly spearing it into the prey, tear the flesh/meat, and take it out back

To perch or hold a tight grip on the cliffs and the rocky habitats

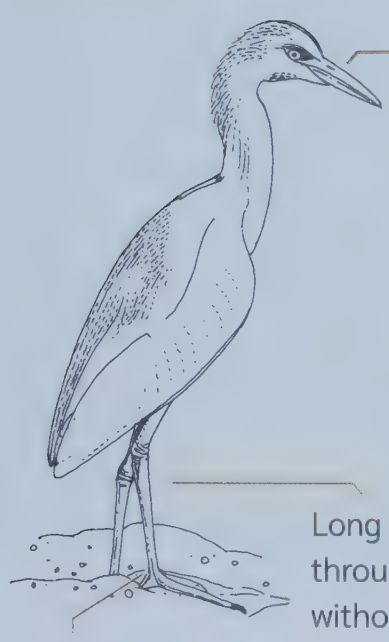
Sunbird



Duck



Cattle egret



Jacana

Additional Information for the Teachers

Characteristics of Birds

- Apart from low weight, feathers and wings that help birds to fly, they also possess air sacs under their wings and have hollow bones that minimise their weight and aid in the flight.
- Wings of birds have evolved from the front limbs
- The birds lay eggs
- The body of the birds is covered with feathers
- The birds are classified under vertebrates

The beaks/bills and the legs adapted to the Nature

- An animal or a bird usually evolves as per the surrounding ecosystem. Let's take an example of the birds - some birds have a straight / regular beak, and some have hooked bills.
  - The bill of a sunbird is long and slender for sucking nectar from flowers.
  - The bill of a parrot is short and curved to break open fruits or seeds and crush them easily.
  - The beak of a crane or a lapwing is sharp and long to enable fishing or probing for insects and eating their prey.
  - The beak of a duck acts like a strainer to filter its food from water.
  - The pelican's beak has a small pouch located at the throat and connected to the lower beak. It scoops large catches of fish and can drain out the water before swallowing the fish.

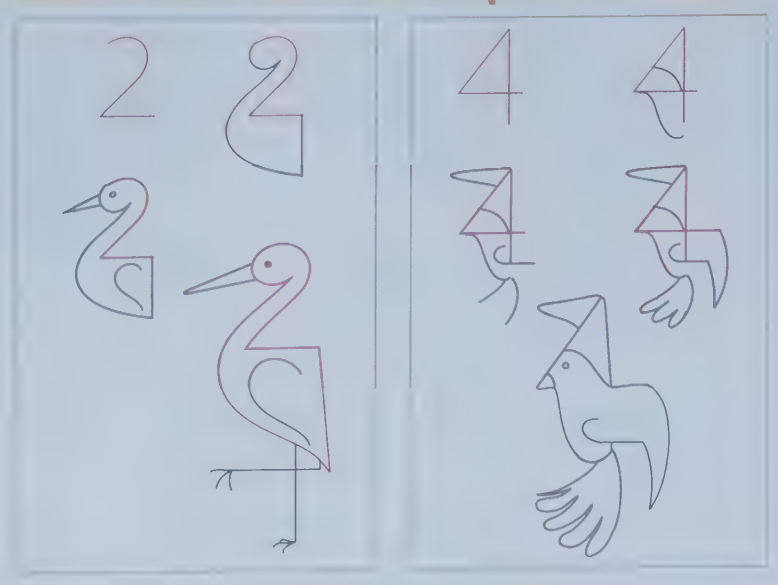
Variation in their legs, toes and claws, depending on their Habitat

- The ducks have webbed feet that help them swim
- The eagles have specially adapted feet and razor-sharp talons to catch and hold on to their prey.
- The feet and claws of the tree birds like crows, parrots, sunbirds, Coppersmith Barbets, Ashy Prinias, bulbuls, Golden Orioles, Jungle babblers are adapted to perch on branches and tightly hold the grip. These birds possess independent flexible toes with one hind toe ideal for grasping perches.

Let us look at a few more interesting examples of bird adaptations:

- **Jacana/ lotus bird (Pheasant-Tailed Jacana)** – this bird can be found inhabiting well vegetated wetlands like the ponds and lakes. It gently moves on aquatic vegetation like the lotus leaves thanks to its long toes which help distribute its weight and seek balance. The Jacana's weight is thus uniformly spread out while foraging. The Jacana builds its nest on this vegetation, and such a floating nest also provides protection from the predators.
- **Woodpecker** - is an exception when it comes to the structuring of its feet which has two front toes and two hind toes whereas other birds possess three front toes and one hind toe. A woodpecker usually forages for insects on the bark of a tree and this unique arrangement of its toes helps it to grasp the tree trunk tightly.
  The woodpeckers have a long, tapered bill used for drilling holes in the trees. The bill helps them peck holes in the tree for food like termites and other insects hidden under the bark of the trees. Its long, sticky tongue pulls out insects and worms from the holes. The pecked holes also serve as its nest. Its skull is made up of a spongy type of bone which cushions its head from the impact of the continuous hammering for making the holes.
- **Lapwing** - is a ground bird found near the wetlands. It can never be seen perching on a tree branch as its specially adapted foot has only three front toes unlike the perching birds which possess a hind toe aiding in grasping the tree branches.

Sketch birds with the help of numbers!



17 Butterfly Watching

Unit

Animals

Activity Duration

2 hours

Activity Month

September

Method

Field visit

Material

Notebook, pen, colour pencils, binoculars

Instructions for Teachers

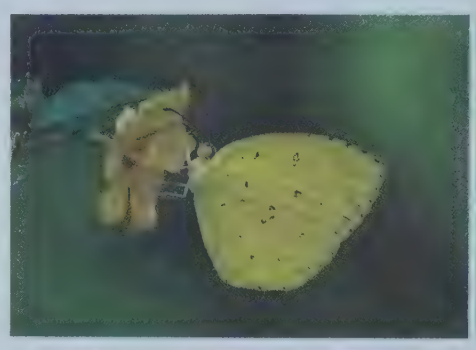
- Identify a grassland / grassy patch with some bushes and herbs in the vicinity of the school campus beforehand.
- Ideally, conduct the activity in September after the rainy season or on sunny mornings before 11 am, as butterflies tend to be active at these times.
- If identification guides for butterflies are available in the school library, carry them to the field visit.
- Refer to the website link provided for additional information on Butterflies.
- Reference books
  - The book of Indian Butterflies, Issac Kehimkar
- Reference website
  - Butterflies of India

Activity

- Take the students to the location selected for the field visit and make groups of 4-5 students each.
- Ask the groups of the students to observe the butterflies and to make note of the following:
  - Which shape and colours does the butterfly display?
  - Are the pattern and colours on the wings and their underside same or different from each other?
  - Which flower/bush is the butterfly attracted to?
  - What does the butterfly do on the flower/bush?
  - What is its flying pattern?
  - Have the butterflies gathered around damp areas?
- Ask the students to note these observations and to sketch the butterflies in their notebooks

Additional Information for the Teachers

Some commonly sighted butterflies



Common Grass Yellow

Common Crow

Common Emigrant

Common Jezebel

Common Evening Brown

Red Pierrot

Objectives:

- To introduce the students to the diversity observed in the butterflies in the surroundings
- To develop observation skills of the students

Common Rose

Common Mormon

Blue Mormon

Lemon Pansy

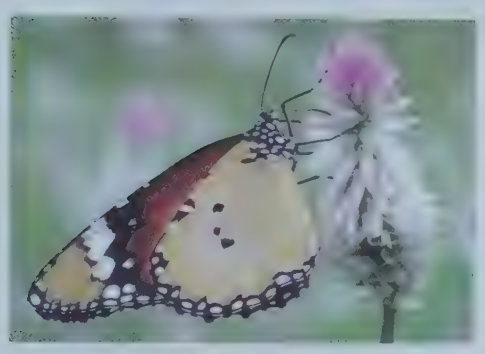
Peacock Pansy

Blue Pansy

Yellow Pansy

Chocolate Pansy

Common Leopard



Plain Tiger

Striped Tiger

Blue Tiger

Glassy Tiger

Lime Butterfly

Danaid Eggfly

18 Interaction with a Snake Rescuer

Indoor

Unit

Animals

Activity Duration

2 hours

Activity Month

September

Method

Discussion

Material

Notebook, pen

Instructions for Teachers

- Snake rescuers or forest department employees trained in dealing with snakes can be contacted for conducting this exercise. They conduct outreach programmes to increase awareness about the snakes, their habitats, mitigation practices in case of snake bite, anti-poaching measures and conduct research about the snakes.
- Get in touch with a snake rescuer working locally, to schedule a session in the school.
- The session should focus on the following points:
  - Introduction to the various species of snakes found locally
  - Differences between the poisonous and non-poisonous (or venomous and non venomous) snakes and major characteristics to identify them
  - Steps to be taken if one encounters a snake
  - First aid measures and treatment for a snake bite
  - Reasons for the needless killing of the snakes, and how to prevent it
- Keep field guides about snakes handy in the class for reference during the activity, if available.

Objectives:

- To introduce the students to the various species of snakes
- To give scientific information about the snakes
- To inform the students about the social misconceptions and myths surrounding the snakes

Poisonous snakes

Indian Cobra

Saw Scaled Viper

Russell's Viper

Common Krait

Activity

- Start the activity by introducing the guest, i.e. the Snake Rescuer to the students and request him to begin the session.
- The Snake Rescuer can talk about the following points -
  - Which snakes are commonly found in the surroundings?
  - What are the beliefs and myths associated with the snakes?
  - Steps to be taken if one encounters a snake
  - First aid measures and treatment for a snake bite
  - Myth busting around all the misconceptions about the snakes
- The snake rescuer can show a snake in the class with due care about the public safety, and discuss about its body parts, behaviour, etc.
- Allot some time for a question-answer session in the end in case the students have any queries and questions.
- Ask the students to write an essay on their learnings from the session, after the activity.

19 Quadrat Study

Outdoor

Unit

Animals

Activity Duration

2 hours

Activity Month

October

Method

Field visit, activity, group-learning

Material

Notebook, pen, measuring tape (3 to 6 nos.), 12-inch ruler, magnifying glasses (3 to 6 nos.)

Instructions for Teachers

- Identify a spot near the school where the students can observe various insects, creatures and animals. For example, a field or a farm, a forest, a seashore, a school garden, a school farm, etc.
- Avoid a farm land which is too dry and select a spot where diversity in grasses/ animal life / fauna can be easily observed.
- The selected quadrat should ideally consist of grasses, herbs, grasshoppers, beetles, butterflies, moths, cockroaches, earthworms, millipedes, snails, shells, spiders, big and small ants, etc.
- Carry the field guides about the plants, animals, butterflies, insects etc. for reference during field work if available in the school library.

Activity

- Divide the class in groups of 3 to 4 students each.
- Take the students to the field work location and ask them to measure one quadrat of 3 feet x 3 feet or 6 feet x 6 feet. If the school is in a desert region, the quadrat can be 50 feet X 50 feet as the diversity tends to be less. Instruct them to mark the quadrat by placing stones at the corners. (Or by positioning sticks at the corners.)
- Give a magnifying glass to each group to make observations effectively.
- Then, ask the students to record the observations in their notebooks based on the following pointers:
  - Number of each type of insects and the animals observed, with their description.
  - Observe the insect activity closely. Describe what they were doing.
  - Number of each type of grasses, herbs, small plants observed, with their description.
- After the students complete recording their observations, discuss the observations made by each group (the number and diversity of the different plants and animals.)
- Then, ask the students, that if such a small piece of land hosts such a beautiful diversity of plants and animals, should we not protect and conserve such areas? Should we not think about this diversity being lost before clearing a patch of land?

Objectives:

To introduce the students to the diversity and density of the animals, plants, insects in one quadrat

20 Visit to a Stream (2)

Unit

Ecosystem

Activity Duration

2 hours

Activity Month

October

Method

Field visit, discussion, and observation

Material

Notebook, pen, colours, pencil, ruler, watch, a crumpled paper ball

Instructions for Teachers

- The activity "Visit to a Stream" is to be conducted thrice in different months during the year. It has been included in the programme accordingly. This will enable the students to observe and understand the changes in the stream occurring throughout the year in different seasons. The students will also learn about the interdependence of various plants, animals, birds and the stream.
- The chances of sighting birds and animals near the stream are higher in the mornings and the evenings. Therefore, plan the trip before 10 am or after 4 pm.

Activity

- Record observations as per the 'Visit to a Stream (1)' activity, in the same notebook used for that activity.
- Record the following observations -
  - Colour of the water
  - Speed of the water
  - Level of the water
  - Vegetation / plants on the banks and in the water
  - Birds, animals, and insects observed
  - Uses of the stream water
  - Pollution in the stream water
- Make a chart as shown below and fill in the details based on the observations.

Observations	July	October	January
Colour of the water			
Speed of the water			
Level of the water			
Plants			
Birds / Animals sighted			
Uses of the stream water			
Pollution in the stream water			

- Speed/ velocity of water should be measured as prescribed in e 'Visit to a Stream (1)' activity.

Objectives:

To introduce the students to the transitions occurring in the stream and its surroundings in different seasons which will encourage them to develop a deep connection with the stream ecosystem

Important Note: Ensure that the tree calendar chart is being regularly updated and engage the students in a discussion about the same. Clarify any doubts and highlight the importance of the activity.

21 Food Web and the Food Chain

Indoor

Unit

Ecosystem

Activity Duration

1 hour

Activity Month

October

Method

Game

Material

Paper chits, twine rope (2 bundles of 30 meters), safety pins (52)

Instructions for Teachers

- For this activity, prepare chits with the names of various animals, flowers, trees and plants, birds, etc. written on them. Make one chit for the 'Sun' as well. **Prepare 2 sets of the chits** with the names given below considering 26 to 28 students in one group. The chits should be large (5"x4") and the names should be bold and legible.
- **Names for the chits:** Sun, grass, grasshopper, chameleon, snake, eagle, tree, flower, bird, insect, deer, tiger, wild boar, fruits, chick (baby bird), kite, frog, hare, leopard, wild dogs, monkey, falcon, fox, vulture, cow, butterfly
- Refer to the website link provided for additional information.

Activity

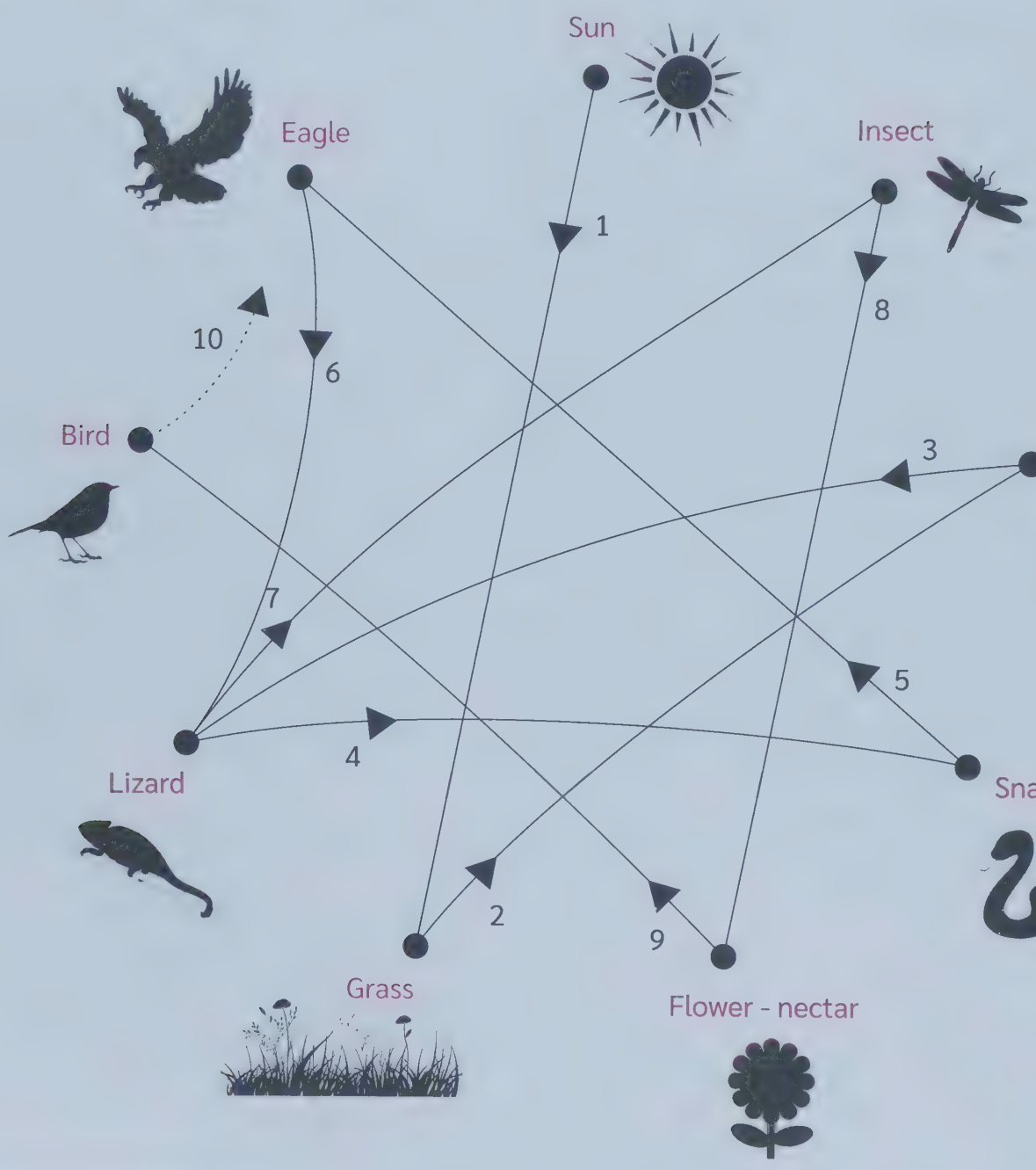
- The maximum number of students for this activity is 26 but the activity can also be conducted with a lesser number of students. Divide the students in groups of 26 and ask them to make a circle.
- Begin the activity by introducing the concepts of food web and food chain.
- Pass the bowl of chits and ask the students to pick one chit each. Once the chits are distributed, each student should read out the name written on their chit and then attach the chit on their uniform with the help of the safety-pin provided. The student with the chit named 'Sun' will stand at the centre of the circle holding the bundle of the twine rope in his/her hand.
- Now, through question and answers, complete the food web. Twine rope goes from the ' food production or producer' to the 'consumer'.
  - Who uses the energy of the Sun to prepare their food? - grass. (Therefore, the student with the 'Sun' chit should hold one end of the twine rope in his / her hand and pass the bundle to the student with the 'grass' chit and so on.)
  - Who eats the grass? - the grasshopper. (Now, pass the bundle of the twine rope to the student with the 'grasshopper' chit).
  - Who eats the grasshopper? - the chameleon.
- Complete the food web in the above manner.
- Prepare small food chains and incorporate them in the food web. This will help the students understand the 'food web' which is made up of numerous food chains. The food chains can be connected from the top predator to the lowest prey or vice versa.
- For example, (note that a new food chain begins with the name in bold letters.)

  Sun→grass→grasshopper→chameleon→snake→**eagle**←chameleon←insect←**flowers/Grass**→deer→ **tiger**←wild boar←**fruits**→chick→**kite**←snake←frog←insect←**flowers**→hare→wild dogs→**leopard**←monkey←**fruits**→birds→**falcon**←**snake**→fox→**leopard**←cow←**grass**→cow (carcass)→vulture
- After connecting all the elements of the web, discuss how it was formed by connecting the smaller food chains together.

Objectives:

- To help the students understand interdependency in the Nature
- To highlight the importance of each element in the food web and the food chain

- Now, demonstrate to the students that when all the members hold the rope tightly, the web remains strong and intact, but if a few members drop the twine rope, the web is disturbed. Then, explain that a twine rope being disturbed can be equated to an animal or plant becoming extinct or its number reducing to an endangered level. Explain to the students how each and every element of the ecosystem is dependent on the other elements and plays a significant role in the ecosystem.



22 Types of Rocks

Indoor

Unit

Soil

Activity Duration

1 hour

Activity Month

October

Method

Discussion

Material

Notebook, pen, map of India

Instructions for Teachers

- Prepare for the activity by reading about the different rock types in India and studying the map and the diagram given below.
- Note that what are commonly perceived as stones are the rocks and minerals found in nature. Learn about their formation process, types, and distribution across the country.
- If possible, bring the samples of different rocks to the class.
- Refer to the website link provided for additional information on types of rocks in India.

Objectives:

To introduce the students to the major rock types in the surroundings

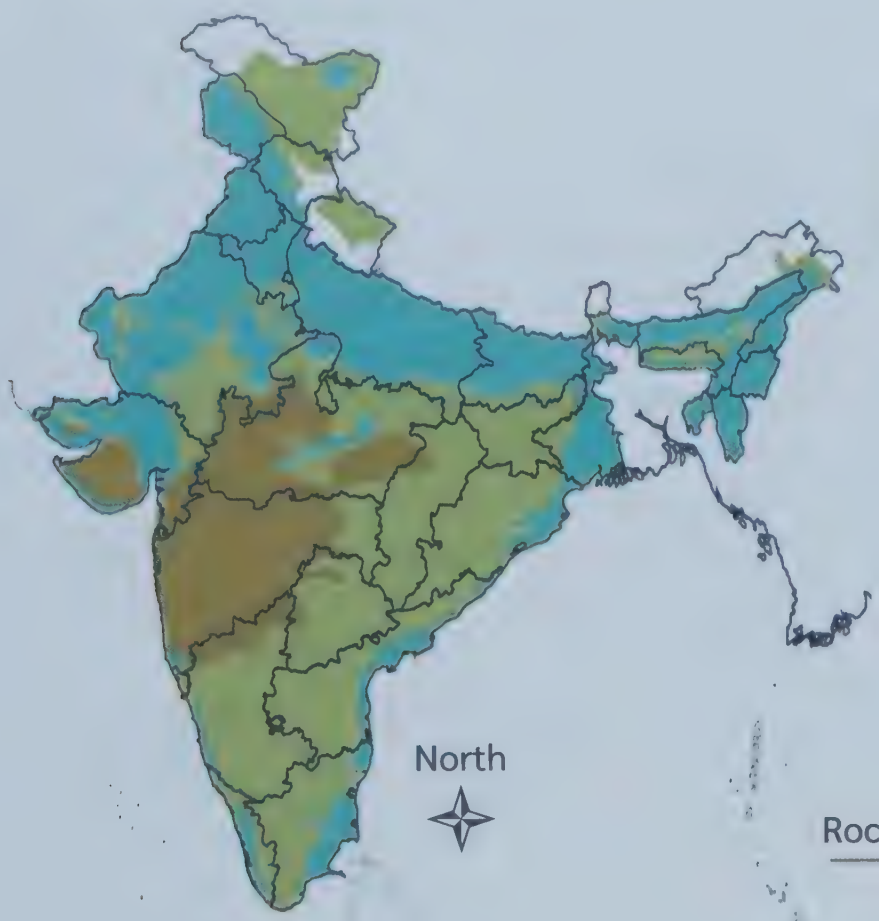
Activity

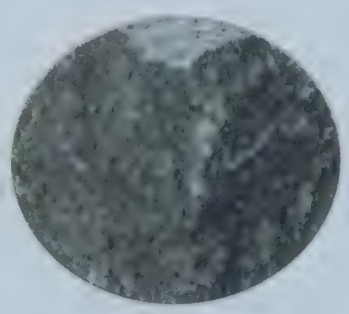
- Begin the activity by asking the students about the various local rock types and if they like to collect rocks. Ask them to describe the different rocks that they know. They may answer- black rock, flint, mica, etc. Write their responses on the board.
- Then explain the basic information about rocks. The earth's crust is primarily composed of rocks. It is a naturally occurring solid mass that is formed as an aggregate of minerals bound together. They can be classified based on their formation process, into three major types: the igneous rock, the sedimentary rock, and the metamorphic rock.
- Introduce the rock formation processes to the students while engaging them in a discussion. For example, ask them, **what is a volcanic eruption?** What does it throw out? The lava. **The solid and hard mass of the cooled lava/magma forms the 'Igneous rock'.** The name 'igneous' is derived from the **Latin word Ignis which means fire,** because it is formed from hot molten material. Draw the diagram given below on the board to explain the igneous rock formation process.
- Moving further to the next rock type, explain that **the igneous rocks break into smaller pieces and eventually into powder,** which settles on the floor of water bodies and forms **layers upon layers for many years.** (Emphasize that geological time is in thousands of years and thus these processes take a lot of time.) These layers accumulate and **solidify due to the pressure of the water and form the 'Sedimentary rock'.** Due to its layered nature, it is also called as Stratified rock (derived from 'stratum'). This type of rock **is found below the sea beds,** floors of the water bodies or in areas where a sea once existed. This rock is softer than the igneous rock. Ask the students if they have seen the soil and the pebbles on the banks of a river and explain that when the soil and the other sediment layers are compressed for many thousand years, it turns into a sedimentary rock.
- During the formation process of the sedimentary rock, **some dead animals or plants get sandwiched in the rock layers** and over a period of many years these dead animals or plants turn into rock which are called the **'fossils'.** E.g. animal bodies, shells, dead aquatic organisms.
- **'Metamorphic rocks'** are formed when the igneous or sedimentary rocks, deep in the earth are subjected to extreme heat and pressure, thus completely transforming the rocks. Such rocks are very rich in minerals.

- Thereafter, show the major areas on the map of India where the three main types of rocks are found. Ask the students to write the examples of the three main rock types and their formation process in the notebook.

Igneous Rock	Sedimentary Rock	Metamorphic Rock
Basalt, Granite	Sandstone, Limestone	Marble

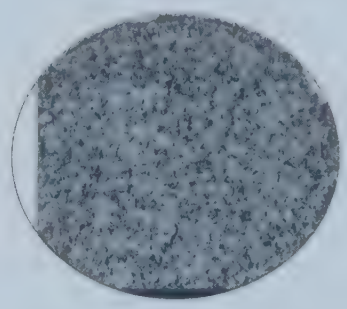
Types of rocks in India



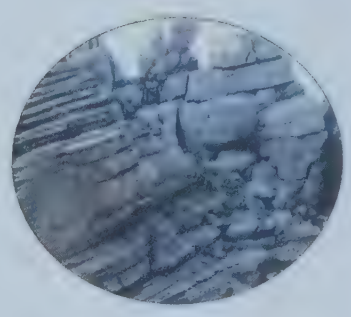


Basalt

Sandstone

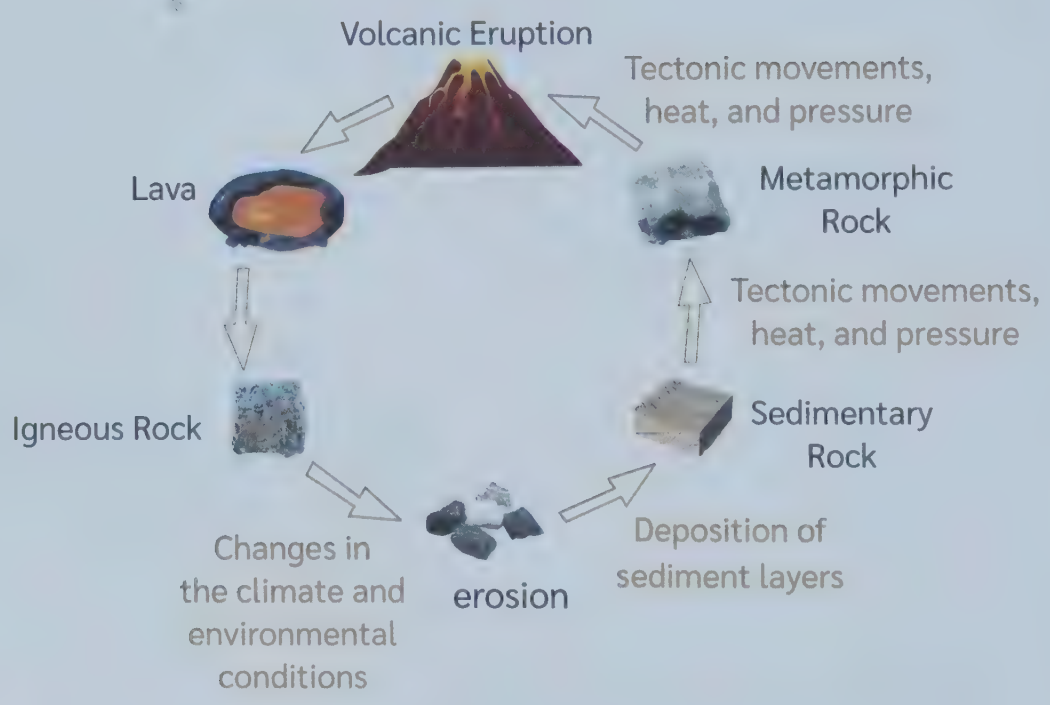


Granite



Limestone

Rock Formation Process



Important Note: Refer to the preparatory activity from the next session about collection of stones and inform the students accordingly.

23 Types of Stones in our Surroundings

Indoor

Unit

Soil

Activity Duration

1 hour

Activity Month

October

Method

Discussion

Material

Notebook, pen

Preparation for the Activity

Ask the students to collect stones of varied sizes, types and colours from the neighbourhood and bring them to the class.

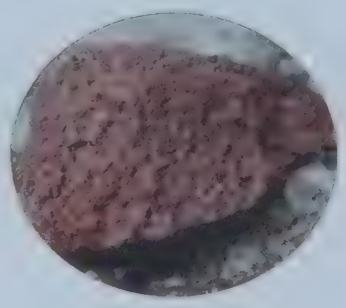
Instructions for Teachers

- Study the information about the rocks and minerals found in the surrounding areas, their names and the formation process.
- If possible, arrange a field visit to a nearby rock mine for the students.
- Refer to the website link provided for additional information.

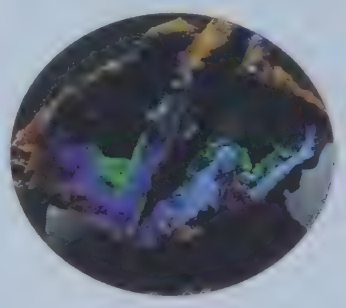
Activity

- Ask the students to collect stones of varied sizes, types and colours from the school campus and bring them to the class.
- Divide the class into groups of 5-6 students each.
- Ask each group to place the stones they had collected from their neighbourhood and the school campus on the floor or on a table.
- Ask the students to categorise the stones based on what they can see and whether they can give names to each category.
- Tell the students that few of these could be 'rocks' as they learnt in the earlier session and few of these specially coloured ones could be 'minerals'. Tell them that minerals make up rocks. Example of mineral are silica (coastal sand is mainly made up of silica), clay (very fine soil), mica etc.
- Thereafter, ask the following questions to the students :
  - What are the uses of the rocks?
  - Which objects, buildings or forts made of rocks have they seen?
- Basalt is a hard rock, and so it can be carved. Many old temples, mosques, churches and caves have been built out of basalt.

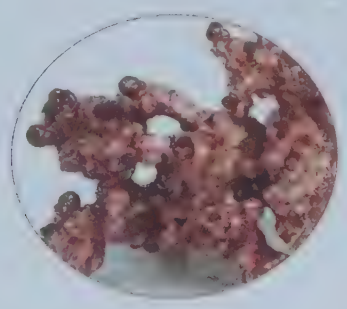
Then, ask the students to write this information in their notebooks.



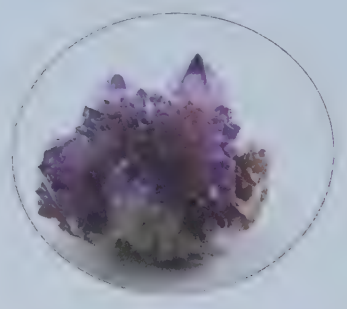
Bauxite



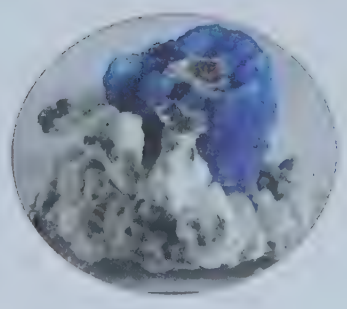
Azurite + Malachite



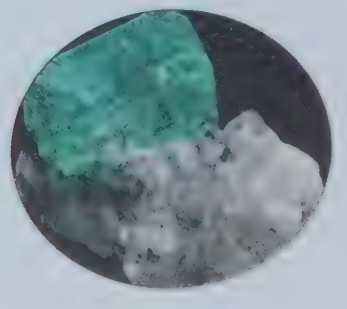
Copper



Amethyst



Cavansite



Emrald

Photo Source: Wikimedia Commons

Objectives:

- To get the students acquainted with the rocks found in the surroundings
- To inform them about the properties and uses of rocks

24 Review 1

Indoor

Activity Duration

1 hour

Activity Month

October

Method

Quiz

Material

Notebook and pen

Instructions for Teachers

- This is a review of all the activities and topics covered till now. Include the questions given below as well as prepare a list of questions based on the previous activities.
- Also, ask the students to come up with a list of questions for the quiz. Reserve half the time for the quiz prepared by the students. The process and participation of the students is much more important than the number of questions they come up with.
- Make sure that all the students are present during the review activity.

Activity

- Include the questions given below in the quiz.
- Divide the class into groups of 6-7 students each.
- Ask them to sit with their groups and help them decide a name for their group - they may choose names of the flora / fauna. For example, Purple Orchid Tree, Flame of the Forest, Mango, Jamun, Deer, Tiger, Gaur, etc.
- Establish general rules for the quiz.
- Draw a score chart on the blackboard to note the points earned by each group.
- Questions like 'True or false', 'Fill in the blanks', 'Answer in one sentence' will get 1 point each and questions requiring a descriptive answer will get 2 points.
- Ask each group to prepare quiz questions and to come forward and conduct the quiz.
- Thereafter, teacher can conduct the quiz as needed using the following questions:
  - What did you do during the project 'tree-calendar'?
  - What would you call the group of animals which consists of dogs, cats, bulls and buffaloes?
  - Name five sources of water found within and outside the village.
  - Name 10 wild animals.
  - How many animals did you see in puddles or in the well? Name them.
  - Animals living on land are called __.
  - Animals living in water are called __.
  - While observing puddles and wells, which trees did you see in the surroundings? (Name 1-2 of them).
  - Describe in 5 sentences the stream visited during the "Visit to a Stream" activity.
  - What is the process of the formation of water vapour due to the sun's heat called?
  - Name the main parts of a plant.
  - The trunk of the plant absorbs water and provides it to the leaves. State whether true or false.
  - Flowers are important for producing the seeds of the plant. State whether true or false.
  - Elephants, camels, wolves and hares are reptiles. State whether true or false. Give reasons for your answer.
  - Mention the characteristics of the insects. Give any three examples.
  - Explain how did you observe animal life in a quadrat?
  - How many types of insects did you find in the quadrat?

Objectives:

To help the students revise the previous activities

- Name the most common colours found in the rocks in your region.
- What is a food chain?
- What is a food web?
- A food web is a component of a food chain, or vice versa?
- A tiger eats the meat of a deer; thus, the tiger is a_____ animal.
- A hare eats grass; thus, the hare is a _____ animal.
- Which sea lies to the West of India? Which sea lies to its East?
- Give an example of a salt water and a freshwater source.
- List any three characteristics of the birds.
- The earthworm is a reptile. State whether true or false.
- Reptiles lay eggs. State whether true or false.
- Name a few poisonous / venomous snakes.
- Name a few non-poisonous / non-venomous snakes.
- A bat is a bird. State whether true or false.
- Where does a stream originate from?
- Name two climbers seen in your surroundings.

25 Types of Soil in the Surroundings

Indoor

Unit

Soil

Activity Duration

2 hours

Activity Month

November

Method

Observation, discussion

Material

Notebook, pen, soil samples, old newspapers, paper, magnifying glass

Instructions for Teachers

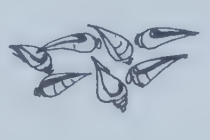
- Collect samples of the topsoil from 3 to 5 different sites in the village / town / city, approximately 1 kg sample each. Soil samples can be collected from stream side, riverbank, farm, school campus, roadside, forest, plains etc. Or ask 4-5 students from the class to collect these samples.
- Study the types of soil found in the surrounding area and its characteristics.
- If there is a rich and protected forest area nearby, make sure to collect samples from there as well.
- Read additional information on the website link provided for an overall understanding of soil types in India. This information can be shared with the students in the discussion.

Activity

- Begin the activity by asking the students, which types of soil have they observed in the surroundings? Where did they observe these soils?
- Then, arrange the collected 4-5 types of soil samples separately on newspapers. Label the samples according to the site that they were collected from. Keep these samples at a good distance from each other so that the students will not crowd for observation.
- Thereafter, divide the class into 4-5 groups and ask each group to observe the given samples.
- Ask them to observe and note the colour, smell, texture, and different components in the soil in their notebooks, along with the name of the soil sample. Write the list of points to be observed on the blackboard.
- Ask the students to describe what can they see in the soil. If available, ask them to use the magnifying glass to observe the soils closely. The students' answers may include **small rocks, soil particles, sand, plant roots, insects, earthworms, seeds, small shells, leaf litter, etc.**
- At the same time, draw a table on the blackboard and add the sites from where the soil samples were obtained.
- After having observed the soil samples, ask each group to present their observations from their notes and fill the information in the table on the blackboard accordingly.
- After the table is filled, engage the students in a discussion about the various features of the different soils. Why is the soil from the farms and from the riverbanks more fertile and different in colour? Tell the students that such soil is **'living soil'** because it contains a lot of organic matter (humus) and is rich in nutrients and microbes essential for vegetative growth.
- Finally, ask the students to draw the table from the blackboard in their notebooks.

Leaf litter

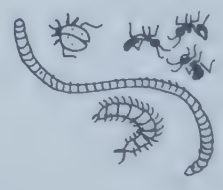
Shells



Seeds

Rocks

Plant roots



Insects, animals

Objectives:

- To introduce the students to the types of soil found in the surroundings
- To make them aware about the components present in the soil

Soil parameters to be observed	Soil from streams / riverbanks and river basins	Soil from farms	Soil found in the school campus	Roadside soil
Colour	Black	Black	White	Brown
Texture	Moist, smooth			Coarse
Components	Small stones/ pebbles, plant roots, insects, earthworms, small shells	Plant roots, insects, earthworms, seeds	Animal faeces, stones, plastic	Small stones and pebbles, insects, plastic
Smell				

The above table is an example. The actual information may differ as per the samples in your region. Write the observations of the students while creating the table on the blackboard.

Important note: Ensure that the 'tree calendar' chart is being regularly updated and engage the students in a discussion about the same. Clarify any doubts and highlight the importance of the activity.

26 Observing the Layers of Soil

Outdoor

Unit

Soil

Activity Duration

1 hour

Activity Month

November

Method

Field visit, discussion

Material

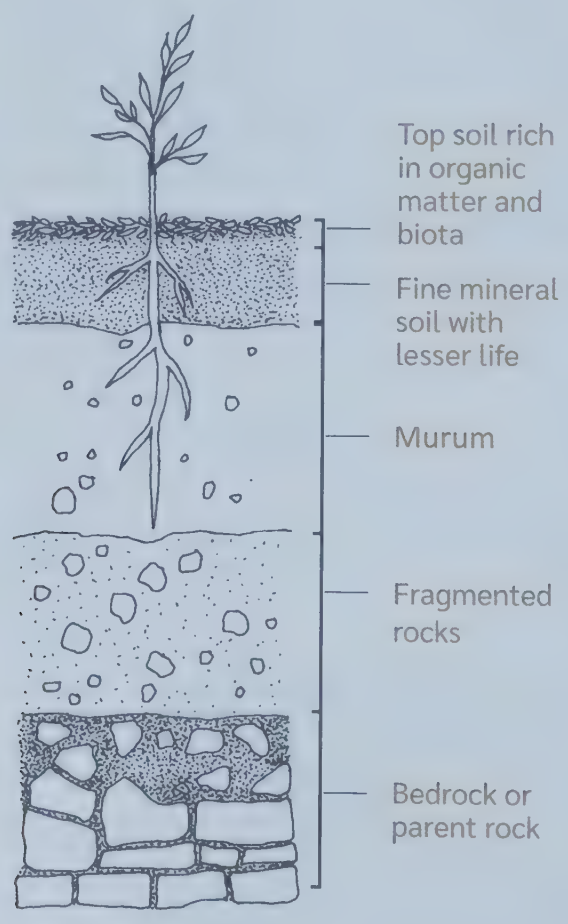
Notebook, pen, pencil

Instructions for Teachers

- Find a section of a land in your neighbourhood which has been excavated vertically such that a cross section is visible, commonly seen at the roadside, where the Public Works Department is widening roads or constructing highways or to a ghat region. Conduct this activity by taking the students to the site.
- If there is no such section of land available nearby, show a similar cross section to the students whenever it is seen at the time of another field visit near mountains/hills.

Activity

- Take the students to an area where they can observe a section of land which has been excavated (vertically) such that a cross section is visible. If no such place is available, draw the diagram given below and discuss the details with the students.
- Show them the different strata of soil: the bottom most layer is made of hard rocks (bedrock or parent rock), above that is a layer of fragmented rock then a layer of murum, then a layer of the black or red coloured fine mineral soil with lesser life and the topmost layer rich in organic matter and biota.
- Ask the following questions to the students:
  - How is the soil formed?
  - If we take a rock and crush it into powder, can we say that the soil is formed?
  - What is the other matter present in the soil, apart from rock particles? (Leaves, earthworms, grass, dried leaves, etc.)
  - How does the soil formation process start? How does a rock develop cracks?
- Towards the end, try to give an estimate of the time required for the formation of soil. Ask the students what do they think that this time might be? 5 years, 50 years, 100 years? Then, tell them that formation of a 2 cm thick layer of soil takes about 500 years. Thus, the topmost layer of the soil must be protected, conserved, and used very carefully. Ask them for which purposes this layer of topsoil is used for or removed?


Top soil rich in organic matter and biota
Fine mineral soil with lesser life
Murum
Fragmented rocks
Bedrock or parent rock

Objectives:

- To make the students aware of the different layers present in the soil
- To explain the process of formation of the soil and the importance of the topsoil

27 Soil as a Filter

Indoor

Unit

Soil

Activity Duration

1 hour

Activity Month

November

Method

Experiment

Material

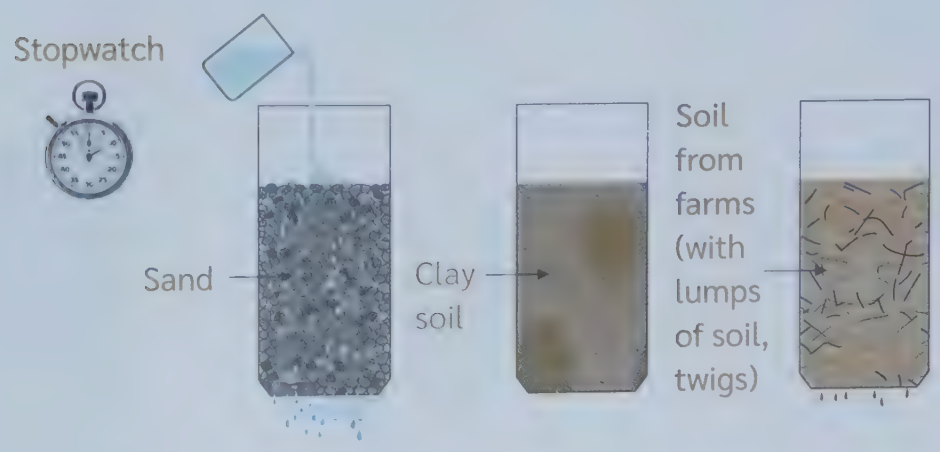
Notebook, pen, 4 plastic bottles of 1 or 2 litres (if 4 bottles not available, use 1), a bucket full of water, an empty bucket, 1 small and 1 large container, soil samples, a watch or stopwatch

Instructions for Teachers

- Collect samples of diverse types of soil, 1 kg each. These types must include **sand, clay, coarse dry soil, soil from farms.**
- Make 8-10 holes at the bottom of the 2-litre plastic bottle and cut about 2 inches from the mouth of the bottle, so that the soil can be easily filled in the bottle.

Activity

- Begin the activity by explaining the objective to the students: **To check the water holding capacities of different types of soils.**
- Ask the students to sit in a semicircle and stand at the centre with all the necessary material with you.
- Ask 2 students to volunteer and then start the experiment.
- Fill the first sample in the bottle by gently pressing it from the top. Do not fill it up to the brim. Ask one student to start the stopwatch to measure the time while you hold this bottle above the empty bucket, start pouring water into the bottle slowly. Ask the students to observe the water dripping from the holes made in the bottle into the bucket. Stop pouring the water when the entire soil column within the bottle is wet enough. Now ask the students to stop the watch and measure the time, and also the amount of water collected in the bucket. Thereafter, empty the soil from the bottle into the big container and clean the bottle. Use the same bottle for all the samples or a new bottle for each sample to conduct the experiment for each sample. **Use the same volume of the soil and water each time.**
- Follow these steps for each soil sample. Ask the students to write the name of the sample and to record the observations. The observations would roughly be as follows:
  - **Sand:** water flows out quickly from the bottle
  - **Clay soil:** a small quantity of water trickles out of the bottle
  - **Soil from farms:** a moderate quantity of water flows out
- Thereafter, inform the students that this property of the soil to hold water is called its **water holding capacity.**
- Finally, ask them which soil sample has the least 'water holding capacity' and which one has the most and discuss the reasons behind this difference. Ask them which soil sample would be ideal for farming: the one with the least water holding capacity or the one with a moderate water holding capacity. In this way explain **the concept of water holding capacity of the soil** to the students.



Objectives:

- To demonstrate the water holding capacity of the soil to the students
- To demonstrate that different types of soil have different water holding capacities

28 Elements in our Surroundings

Indoor

Unit

Ecosystem

Activity Duration

1 hour

Activity Month

December

Method

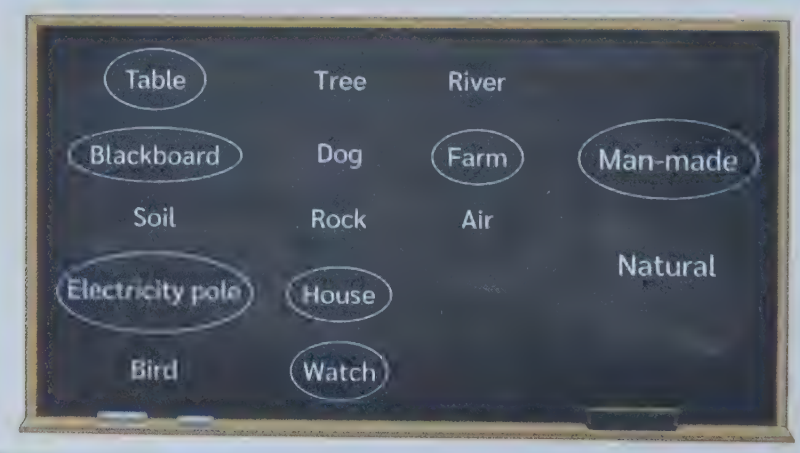
Observation and discussion

Material

Pen, notebook, pencil, ruler

Activity

- Ask the students to name the different objects (or elements) that can be seen in the class and in the surroundings. List the answers on one side of the blackboard.
- Ask the students to classify these objects / elements.
- Then, ask the students to make a table to differentiate between 'natural' and 'man-made' objects/elements. Discuss the objects they have classified as 'man-made' and the reasons behind it.
- Explain the following concepts to the students:
  - Though the objects / elements are man-made, **the raw material required for them comes from 'Nature'.** For example, a brick, a man-made object, is made from the soil found on the riverbanks. Thus, the soil required to make a brick essentially comes from nature while the process is done by the humans and so it is a manmade object.
  - Since **every man-made object is made from the raw materials found in the Nature,** it is very important **to use natural resources consciously** and protect the Nature.
  - Each natural resource that is used as a raw material to make different objects takes a very long time (imagine geological time scale) to form in the Nature. **In comparison to this time scale, the rate at which objects are consumed and thrown away by humans is almost instantly.**
- Now, ask the students to categorise the list of the objects on the blackboard into **living** and **non-living** objects.
  - Ask them to contemplate on the following. Are these living and non-living objects essential to us and how? Is there an interconnection between the different objects and elements in nature?
- Channelise a discussion on this topic by asking questions like:
  - Do we need living elements more than the non-living?
  - We cannot do without trees; can we do without the soil? Or if we have the soil, can we do without the trees?
- Explain that both the biotic and abiotic elements/ components are equally important in Nature.
- Highlight the point that "Unless the nature is prosperous, the humans will not be able to lead a healthy and prosperous life.



Objectives:

- To encourage the students to observe their surroundings
- To help them classify the different elements in their surroundings

29 Map of the School and Surroundings

Outdoor

Unit

School/settlement

Activity Duration

2 hours

Activity Month

December

Method

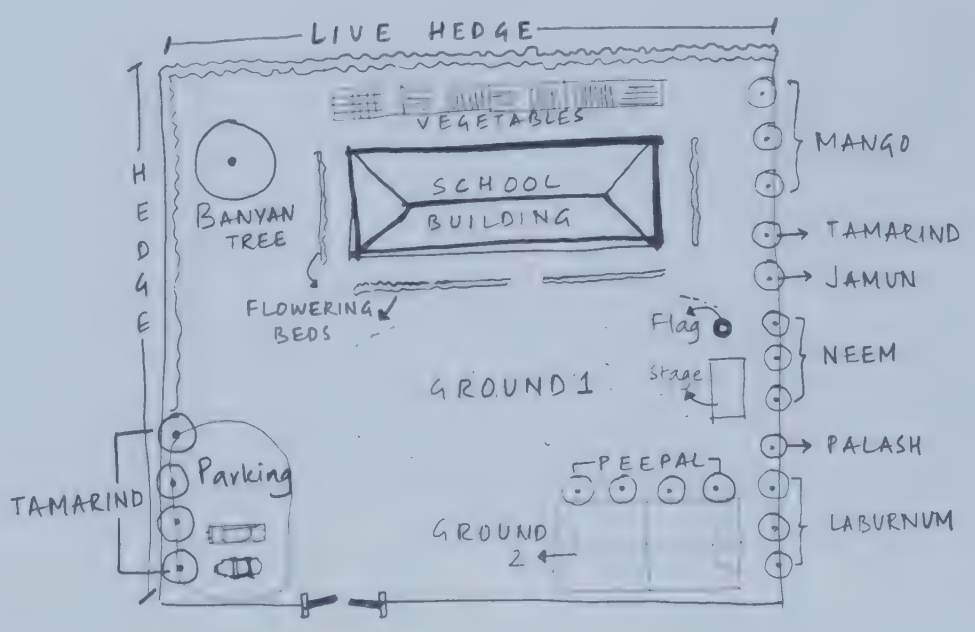
Hands-on work with tools

Material

Measuring tape (3), notebook, pen, ruler, pencil, paper

Activity

- Introduce to the students that they have to map the school and its surroundings in this activity by taking measurements. Divide the class in groups of 4-5 students each.
- Give a specific name / number to each group and provide them with some papers.
- First, talk to the students about the understanding and orientation of the directions. Identify the four main directions on site. Ask them how directions are shown on a map and then mark them on the paper.
- Then inform them that they need to **measure** the following (with the help of a metre-scale or by measuring with footsteps).
  - Roads or pathways in the school (length and width)
  - Open spaces, fields, or grounds (length and width or radius)
  - Mark the trees, flagpole, laboratories, library, other important elements like hand pump or well (if any) by measuring the distances. Use different symbols for each types of element.
  - Map the garden if any.
  - If there is a river or a stream near the school, what is the distance from the school to the river / stream? Are there roads in between? Try to map them as well.
  - In case of coastal regions, how far is the sea from the school?
  - Ask the students in each group to write their names and their group name and number behind the map.
  - Mark the directions on the map.
- After giving these instructions, ask the students to go to different parts of the school in their groups and make a map of the school. Help and guide them wherever needed.
- Collect the maps completed by the students and display them in the classroom.



Objectives:

To provide hands-on experience about scales, measurements, layout of a village / settlement / housing colony, and a sense of direction to the students

30 Story of Agriculture

Indoor

Unit

Agriculture

Activity Duration

1 hour

Activity Month

December

Method

Discussion, group learning

Material

Pen, notebook, map of your state

Instructions for Teachers

- Read the story about the history of agriculture given in the additional information.
- Refer to the website link provided for a detailed reading on the subject.

Activity

- Start the activity with a discussion about agriculture. Ask the students, what is farming or agriculture? What does it encompass? During the discussion, explain that to sow a single type of seed in a specific area, cultivate the crop and harvest the output is farming or agriculture.
- Thereafter ask the students **when did the concept of agriculture evolve and how did agriculture begin?** After listening to the students' responses, narrate the story "The History of Agriculture", as given below.
- After the storytelling, ask them to write the story in their own words in their notebooks. Give them 10 minutes for it.
- Then, ask them to name the crops that are cultivated locally and record these names on the board.
- Ask the students the following:
  - What does their daily diet consist of? Where are these crops cultivated?
  - Ask leading questions so that students understand about the crops grown locally and the produce that needs to be sourced from outside.

Additional Information for Teachers

The Story of the History of Agriculture

The modern human evolved from the primitive man, through a period of about 1 million years. The period saw many changes in the way the man lived. The primitive man led a hunter-gatherer's life by hunting wild animals and collecting roots, seeds, and fruits from forests. With time, the realisation that the seeds thrown away after eating the fruit eventually grew into a tree which in turn provided more fruits, human societies might have turned to agriculture. Humans observed that they could grow specific crops by sowing specific seeds. This is probably how agriculture originated approximately 10,000 years ago.

Gradually, humans got to know about the life cycle of plants and after numerous trials and errors over many years, they understood which grains and crops were nutritious and essential for good health. By observing the weather and soil conditions required for a specific crop, the staple crops of a specific region came into being. Then humans began clearing forest cover and started planting seeds on a large scale. Thereafter, the plough was invented, and humans started domesticating animals for various activities like carrying ploughs. Horses and eventually bullocks were used in different parts of the world for many agricultural activities.

Objectives:

To acquaint the students to the history of agriculture and main local crops

Important notice: Ensure that the tree calendar chart is being regularly updated and engage the students in a discussion about the same. Clarify any doubts and highlight the importance of the activity.

31 Introduction to the Local Farming Practices

Indoor

Unit

Agriculture

Activity Duration

1 hour

Activity Month

December

Method

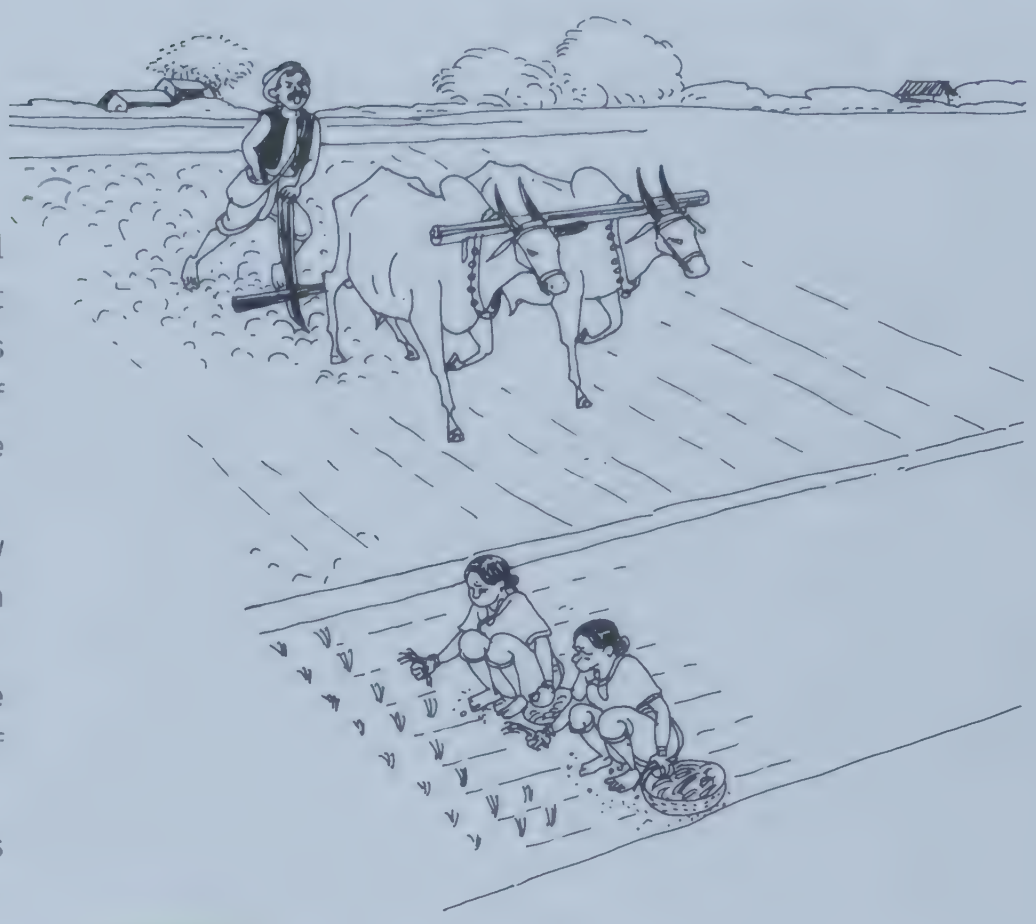
Interview & writing

Material

Pen, notebook

Instructions for Teachers

- Identify and get in touch with a local farmer who can talk about the different farming practices to the students. It is best if the farmer cultivates a variety of crops but not the crash crops (like sugarcane, cotton, soyabean, etc.).
- Check if the farmer will be willing to show his/her farm to the students later and plan for the visit.
- Inform the farmer on the topics to be covered in the classroom session, some of which can be as follows:
  - Introduction (name, age, no. of years practicing agriculture)
  - Crops cultivated by the farmer
  - Months in which these crops are cultivated and harvested
  - What is the water requirement of these crops? Are there any specific plants / trees planted in the farm? Why are they planted?
  - Enumerate the different farming practices - weeding, soil preparation (ploughing and levelling), sowing seeds, harvesting, threshing, etc.
  - How many people work on the farm?
  - What is the average annual income & is it sufficient for the farmer's family? (Optional)
  - Is the farm produce sold? Where is it sold?



Activity

- Ask leading questions about farming to the students and have them make a list of questions for the farmer. Also guide them about how to conduct an interview smoothly.
- Introduce the farmer to the students and ask him/her to deliver the session. Plan for a question-and-answer session, after the farmer's talk.
- Ask the students to interview the farmer and ask additional questions if required so that all the concepts are covered and clarified.
- Make a list of the main farming practices discussed in the session, on the blackboard. If time permits, ask the students to document all the details shared by the farmer immediately after the session, in class.

Objectives:

To introduce the students to the various farming practices

32 Hands-on Work on a Farm

Outdoor

Unit

Agriculture

Activity Duration

2 hours

Activity Month

December

Method

Farm visit and group work, experience writing

Material

Procure farm equipment based on the number of students present for the activity.

Instructions for Teachers

- Request a local farmer to allow the students to work on any of the regular agricultural tasks in his farm.
- Plan for this activity in the early morning to avoid the sunstroke / afternoon heat

Activity

- Make groups of 4-5 students each and inform them that they have an opportunity to work on a farm.
- Accompany them to the farms & ask the farmer to give specific instructions to the students regarding the tasks at hand. Request the farmer to demonstrate important tasks like weeding, ploughing, sowing, threshing, etc. (although usually these tasks are not performed simultaneously).
- After consulting with the farmer, allocate separate sections on the farm to each group.
- At the end of the activity, ask the students to discuss about their experience of working on a farm and pen down their experiences.

Objectives:

- To sensitise the students to the physical hardships involved in agricultural work
- To help students recognize farming/agriculture as a valuable, respectable and a fulfilling occupation as any other type of employment
- Experiential learning for the students on the farm

Important Note : Refer to the preparatory activity from the next session and instruct the students accordingly.

33 Climate, Seasons and Diet

Indoor

Unit

Seasons and Climate

Activity Duration

1 hour

Activity Month

December

Method

Discussion and writing

Material

Map of your state (both geographical and political), notebook, pen

Preparatory Activity

- As an assignment before this activity, ask the students to collect information related to the food habits of their grandparents or other elderly people in the neighbourhood. Here are some questions that the students can ask:
  - What was the traditional dietary pattern in the past? Describe a typical traditional meal from your young age?
  - From where were the ingredients for the meals sourced?
  - Did the diet vary as per the season?
  - Which wild/uncultivated fruits or vegetables brought from forests) were included in their diets? In which season?
  - Which crops were cultivated locally?

Instructions for Teachers

- Read and research about the traditional and local food habits
- Refer to the website link provided for additional information about the diversity in the food as per the seasons.

Objectives:

- To introduce the students to the traditional local diets
- To explain the diverse dietary habits based on the regional climate and seasons

Activity

- Check if the students have completed the assignment and ask them to discuss on the following:
  - What was the staple local food in the past? Describe it. Which millets / pulses / grains were part of the diet?
  - From where were the vegetables sourced? Which wild/ uncultivated greens (vegetables) and fruits were procured from the forest? In which months were such wild greens available?
  - Which crops were cultivated locally in those days?
- Make a note of these points on one side of the board.
- Now ask the students about their current food habits and preferences.
  - Do their mothers make any preparations from the wild/ uncultivated vegetables while cooking? Do they know the names of these vegetables?
  - What does their daily diet consist of?
  - Where do they buy the vegetables from?
  - Which vegetables or crops are cultivated in the village/town/city neighbourhood?
- Note all this information on the other side of the board.
- Based on the notes on the board, ask the students to find the differences between the old and the current dietary patterns.
- Then explain to the students that in the past, people used to consume the crop which was cultivated locally. Thus, people would eat bhakri/roti made from rice flour or rice and side dishes in the region where rice was cultivated locally. People living near mountainous regions would have Ragi, while corn would be used in North India etc. Give examples appropriate to your region.
- Traditional eating practices meant that the humans lived in harmony with Nature - one could only eat seasonally available foods. In the past, cucumber would not be available round the year, but only during the summers, when its cooling properties were most required. Similarly, wild greens or vegetables were consumed during the rainy season, Sesame and Bajra which provide warmth were consumed during winters. Dietary pattern of human beings was thus completely dependent on the seasonal cycles.
- Display the map of your state and identify the regions with heavy, moderate and low rainfall. Also discuss how the temperature varies in the state. Now compare the local diets from these regions (there might be some overlaps).
- Ask the students to identify their own district on the map and discuss the staple diets. Record the discussion on the board.

34 Visit to a Garden

Unit

Ecosystem

Activity Duration

2 hours

Activity Month

January

Method

Field visit

Material

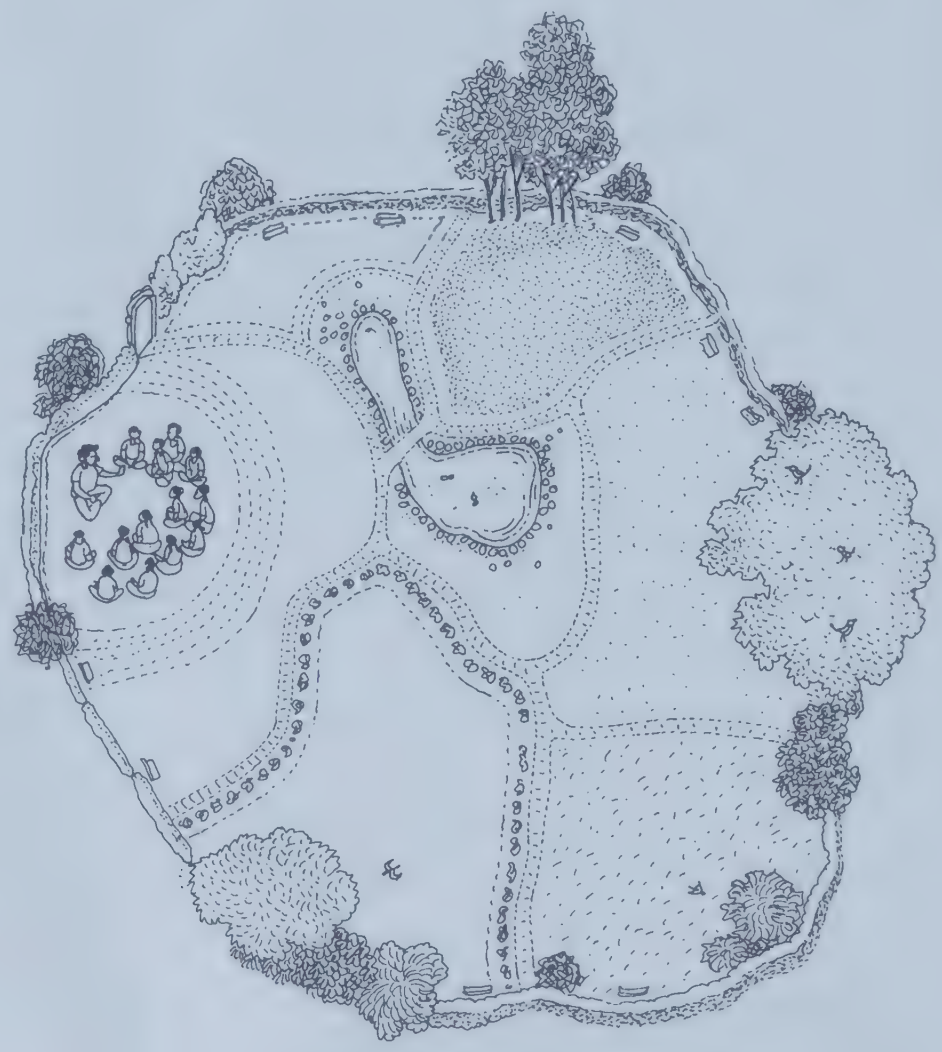
Notebook, pen/pencil, scale

Instructions for Teachers

- Identify a park or a public garden in the vicinity of the school and check the visiting hours.
- Allocate time as given below for observations-
  - Different elements/ components of the garden : 10 - 12 minutes.
  - Tree census and observation: 15 - 20 minutes.
  - Writing : 15 minutes
- Check if the gardener can be available to provide more information about the plants.
- Carry field guides of plants, butterflies, birds, if available in the school library.

Activity

- Take the students to a park/garden and ask them to make a **list of all the components** that they notice in the park/garden.
- Ask them to classify these components as **living / non-living** and **natural / man-made.**
- Make groups of 5 -6 students each and allocate the following activities to the groups:
  - Count and note the number of large trees
  - Name the trees (with the help of the gardener if he is available)
  - Record the number and names of the birds, butterflies, and insects sighted.
- Ask the students to verify if a **food chain** can be formed from the living things in their list, and record it in their notebooks.
- Ask the gardener to explain the seasonal changes that are observed in the garden.
- Ask the students to identify the differences between a garden and a natural forest in brief.



Objectives:

To identify the basic components in a park/garden ecosystem and find their interdependence on each other

35 Skit Performance

Indoor

Unit

Ecosystem

Activity Duration

3 hours

Activity Month

January

Method

Dialogue writing, skit performance

Material

Notebook, pen

Instructions for Teachers

This activity is to be conducted in 3 hours, 1.5 hours to be allocated for dialogue writing and 1.5 hours for the skit performance of about 5-6 minutes each.

Activity

- Make groups of 5 - 7 students each and inform the students that each group has to perform a skit.
- Read out the **introductory part of the story** as given below to the students and ask them to **complete the story in the form of a dialogue.**
- In order to explain how to write a dialogue, ask them to imagine a conversation in a film/a play/ or television show and ask them to write in the similar manner.
- Ask them to include all parts or aspects of the story in their dialogue.

Story: On a Sunday morning, Ramu was home with his grandmother, while his parents and little sister were away at his uncle's place.

Unfortunately, none of Ramu's neighbouring friends were around to play with him that day which meant he had nothing to do. After breakfast, Ramu's grandmother went for a nap and eventually Ramu got bored. Once he was sure that grandma was asleep, he decided to take a stroll along the nearby stream.

This little stream flowing by his house was his favourite spot especially when he was tired, angry or bored! Since he frequented the stream often, he knew the vegetation, birds and fishes in the surroundings well. As he sat **below the Jamun** tree as usual, he heard a voice **from the stream** and to his surprise, a **fish** was staring at him from the bank. Soon his other friends - a **squirrel** and a **black drongo** landed on the Jamun tree. Ramu stared at everyone in disbelief and exclaimed to the fish :

Ramu :

Fish :

Squirrel :

Jamun tree :

Drongo :

Stream :

Objectives:

To encourage development of the creative skills of the students such as writing, imagination, planning and teamwork

- Ask the students to imagine the conversations between all these characters and inform them that the topic of conversation would be Nature-centric.
- See to it that the students can make use of various spaces in the school campus for writing the dialogues.
- After writing the dialogue, each group should come forward to perform the skit.
- Invite other classes and parents for the skit performance.

Important Note : Ensure that the tree calendar chart is being regularly updated and engage the students in a discussion about the same. Clarify any doubts and highlight the importance of the activity.

36 Visit to a Stream (3)

Outdoor

Unit

Ecosystem

Activity Duration

2 hours

Activity Month

January

Method

Field visit, discussion & observation

Material

Notebook, pen, colours, pencil, ruler, watch, ball of crumpled paper

Instructions for teachers

- This activity 'visit to a stream' is to be conducted thrice in different months during the year. It has been included in the programme accordingly. This will enable the students to observe and understand the changes in the stream occurring throughout the year in different seasons. The students will also learn about the interdependence of various plants, animals, birds, and the stream.
- The chances of sighting birds and animals near the stream are higher in the mornings and the evenings. Therefore, plan the trip before 10 am or after 4 pm.

Activity

- Record observations as per the activity, "Visit to a Stream (1)". in the same notebook used for that activity.
- Record the observations of the following:
  - Colour of the water
  - Speed of the water
  - Level of the water
  - Vegetation/the plants on the banks and in the water
  - Birds, animals and insects observed
  - Uses of the stream water
  - Pollution in the stream water
- Make a chart as shown below & fill in the details based on the observations.

Observations	July	October	January
Colour of the water			
Speed of the water			
Level of the water			
Plants			
Birds/Animals sighted			
Uses of the stream water			
Pollution in the stream water			

- Speed/ velocity of water should be measured as prescribed in the 'Visit to a Stream (1)' activity.
- After filling the chart, engage the students in a discussion around the seasonal changes observed in the stream ecosystem.
- Students can try to write inferences from the completed table, e.g. water was muddy in July but very clear in January or differences in the level of the water etc.

Objectives:

To introduce the students to the transitions occurring in the stream and its surroundings in different seasons which will encourage them to develop a deep connection with the stream ecosystem

37 Sources of Energy

Indoor

Unit

Energy, industry, pollution

Activity Duration

1 hour

Activity Month

January

Method

Discussion, learning through an illustration

Material

Illustration given below, pen or pencil, notebook

Instructions for Teachers

Ask the drawing teacher to draw the illustration given below on the blackboard or on a chart paper before the activity is to be conducted. If done on the chart paper, display it permanently in the class by pasting it on a cardboard.

Activity

- Display the illustration in the class and ask the students to describe the different activities that can be seen.
- Draw the table given below on the blackboard and record their answers in the first column of the table. For example, a woman washing clothes, a man driving a bullock cart, a light bulb, etc.
- Ask the students to imagine the kind of strength or energy required to carry out all these activities.
- To make it easy for them to understand, fill in the details in the table on the board as follows: Record the answers given by the students in the second column and in the third column, note the names or the types of energy.

Activities / Observations	The Strength / Energy Required	Name of the Energy
Woman washing clothes	Human energy	Manpower
Bullock pulling a cart	Animal energy	Animal power
Burning wood	Fire	Heat energy
Bursting Fire crackers	Electricity	Electrical energy
Bursting Fire crackers	Ammunition	Chemical energy
Sunlight on trees	Solar energy	Light energy
Riding a bicycle	Human energy	Kinetic energy
Riding a motorcycle	Diesel/petrol	Chemical energy

- Ask the students to copy this table in their notebooks
- After the discussion about the illustration, ask the students to observe other activities around them and note down the type of energy required for those activities in the above table.

Objectives:

To help the students learn about the different types of energy

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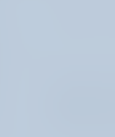
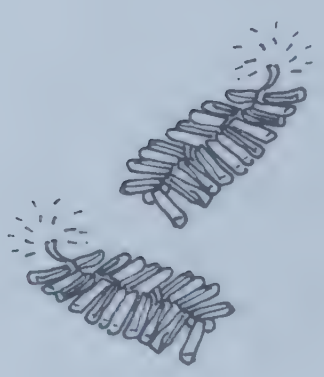




38 Types of Pollution and their Effects

Indoor

Unit

Pollution

Activity Duration

2 hours

Activity Month

January

Method

Discussion, storytelling, discussion about illustration

Material

Picture, pen, notebook

Instructions for Teachers

Ask the drawing teacher to draw the illustration given below on the blackboard or on a chart paper before this activity. Display this chart paper pasted on a cardboard permanently in the class.

Objectives:

- To help the students learn about the types of pollution and their effects on the environment
- To improve the observation skills of the students

Activity

- Read out the following **"Story of Pollution"** to the students.

Once upon a time, a war broke out between the Gods and the demons. The Gods won the war, and the destructive demons were banished to hell. However, they still wanted to return to the Earth and therefore, they started worshipping the Gods.

They pleased the Gods with their prayers and penance and were asked what they desired. The demons expressed their yearning to return to the Earth. The Gods told them that this is almost impossible, but they will be able to return only if the humans make mistake and destruct the nature, that the demons will be able to go to the Earth through air, water, soil pollution created by humans. The demons waited and waited. Lo and behold, humans indeed started exploiting the nature, causing degradation and creating pollution of air, water, soil, noise and also deforestation.

The pollution became rampant creating a lot of nuisance everywhere, right from small villages to large cities! Eventually, the people on the Earth contracted dangerous diseases like jaundice, malaria, flu, cough, throat infections and diseases of stomach, respiratory tract, and skin. Humans began praying to the Gods for protection from these diseases, and then one fine day, the Gods were pleased with their prayers. Humans asked the Gods to take away the pollution. The Gods told them that **it is humans who have created the pollution by their own deeds, and it is only them, who can protect and restore the nature so that the demons in the form of the pollution leave the Earth.** The Gods told the humans that if they protect and live in harmony with nature, restore natural resources like air, water, soil, forests to their original splendour, then their future will in turn become secure and prosperous! Thereafter, the humans started to reduce the different types of pollution and protect nature and environment.

- After the story reading, ask the students these thought-provoking questions:
  - Have they seen these demons which cause pollution?
  - When they go home from the school or from the market, what do they notice around them?
- Their answers could be as follows:
  - Many people, crowds
  - Traffic on the road
  - Shrieking car horns
  - Water lying around after washing the vegetables
  - Littering of vegetable waste, paper, plastic on the roads
  - Smoke from the industries
  - Chemicals discharged into the water bodies
  - Chemical pesticides from farms

- Record all the answers given by the students on the blackboard. (Make the table as given below).
- Show the illustration about the pollution and ask the students to describe what they can see and engage them in a discussion. For example, if the students point out the image of a girl holding a handkerchief on her nose, ask them why she is doing so? If they answer that the colour of the river water is black, ask them the reason behind the same.
- Engage the students in a discussion about each action given, write down what happens because of the action in the second column and its effects on us in the third.

Action	What it produces	Effects
Noise from car horns	Noise	Headache
Traffic on the road	Noise, smoke	Burning of eyes, cough, etc.
Vegetable waste, paper, plastic littered on the road	Foul odour, flies on the waste	Nuisance from the foul odour

- After having filled the table, ask the students what they understand from the **effects** of these actions.
- After this discussion, explain that all the actions from this table cause unpleasantness or **pollution** and are harmful for man and nature.
- In short, explain that any element or its use increases beyond its natural limit, will cause problems in the environment, and this effect is called pollution.
- Thereafter, change the name of the second column of the table to the **'types of pollution'** and write the terms noise pollution and air pollution in the column.
- Ask the students to draw this table in their notebooks and explain that they are fortunate if this kind of pollution does not exist in their locality. Engage the students in a discussion about the measures that can be taken so that this kind of scenario does not present itself in the village.
- At the end of this discussion, highlight the point that playing loud music on large loud speakers, unnecessary honking on the roads, disturbs both human and non-human beings. This kind of behaviour must be strictly avoided.

39 Water Pollution

Outdoor

Unit

Water

Activity Duration

2 hours

Activity Month

February

Method

Site visit and self-study

Material

Notebook, pen, pencil, binoculars (if available)

Instructions for Teachers

Identify a spring or pond or river or lake in the vicinity of the school where different kinds of pollutions can be shown to the students.

Activity

- Take the students to an identified spot on the bank of the river or stream, from where a large part of the water body is visible. Ask them to observe the following points:
  - Which components of the river can they see? Are the components natural or man made?
  - Discuss that the fallen leaves are a natural component while plastic is a man-made one.
- Explain that though the fallen leaves are a litter, they do not harm the water bodies whereas man-made components damage the river or stream ecosystem.
- Ask them to check and record the following:
  - Is the sewage water being discharged into the river/stream?
  - Are clothes being washed on the banks of the river/stream? Is any field/agricultural drainage discharged into the river/stream? Has the water colour changed because of this?
- At the end, engage them in a discussion about who can be held responsible for water pollution, the alternatives to reduce water pollution, and how every citizen can shoulder the responsibility of avoiding the pollution.
- Ask the students to record the observations in the notebooks.

Objectives:

To observe and identify the causes of pollution of water bodies such as a stream, river, pond or lake in the surroundings

Important Note: Ensure that the tree calendar chart is being regularly updated and engage the students in a discussion about the same. Clarify any doubts and highlight the importance of the activity.

40 Best out of Waste

Indoor

Activity Duration

2 hours

Activity month

February

Method

Hands-on work, art and craft

Material

Dry waste, paints, paint brush, glue or library paste, thread, twine rope, water, old newspapers

Instructions for Teachers

- Ask the students to collect the dry waste from home and school 2-3 days in advance, to be used in the activity.
- The dry waste may include paper, thermocol, all types of plastic bags, food packages, cardboards, different types of bottles, fabric remains, etc.
- Involve the art teacher or other teachers and older students with an artistic inclination to help in this activity.
- Avoid using material like the cello tape, fevicol, stapler. Instead use biodegradable material like library paste, pins and twine rope.

Activity

- Make groups of 5-6 students each and give the material mentioned above to each group.
- Ask the students to make useful things that they can think of from the collected waste.
- Encourage the use of natural glue - library paste, which can be made by the students by cooking wheat flour in water.
- Work with the students, especially those who need help and try to encourage them. This will get them enthused.
- Show the pictures given below to the students.
- Exhibit the articles created by the students in the class and invite other students and parents for the exhibition.
- During the annual day or fair of the school, encourage the students to put up a stall of such articles for sale.

Planters made from waste plastic bottles

Pen stand made from waste cardboard box

Objectives:

- To help the students understand that the waste generated by them can be reused to make useful articles
- To tickle the creativity of the students

Decoration/festoons/pennants made from fabric waste

Piggy bank made from waste plastic bottles

Pen stand made from old newspaper

Swing made by using an old tyre

41 Sketch and Describe a Tree

Unit

Plants

Activity Duration

1 hour

Activity Month

February

Method

Activity

Material

Paper, pen, pencil, crayons and colour pencils

Instructions for teachers

- Reference books
  - Jungle Trees of Central India: A Field Guide for Tree Spotters- Pradip Krishen

Activity

- Ask every student to choose a tree from the school campus. If there are only a few trees, make groups of 4-5 students each and allocate a tree to each group. Ask them to **carefully observe the tree and sketch it** in detail.
- Explain that they should try to sketch and colour the details of the trees, like the leaves, flowers, and fruits.
- Ask them to also **write a description** of the tree.
- Teacher should emphasise on 'diversity of trees' through all these sketches. Some trees could be in full blooms. While some could be completely leafless and flowerless. Few might have leaves or foliage. Discuss with students that how these various stages are helping other species.

Objectives:

To help the students improve their observation and expression skills

42 Fun with Bark and Canopy

Outdoor

Unit

Plants

Activity Duration

1 hour

Activity Month

February

Method

Field Visit

Material

Blank papers (preferably taken out of an old drawing notebook), pen, pencil, black crayon

Instructions for Teachers

- Identify a few trees from the school campus, from the earlier activities related to plants.
- Select the trees which provide dense shade and those which provide sparse shade as well.

Activity

- Make groups of 4-5 students each and ask them to draw the patterns of the tree bark on a paper using pencils and crayons. Help the groups as required.
- Draw the students' attention to the diversity observed in the tree barks. Some of the barks are smooth and some are rough, whereas some are thorny, and some are cracked. Ask them to observe type of insects living inside the bark, if seen. Ask them to write the name of the tree in the corner of the paper.
- After tracing the bark of a tree, ask the students to observe its shade and then to write a description of the shade on the same paper, e. g. dense shade, sparse shade, or no shade. Explain that this is dependent on the type of the foliage of the tree. Standing under different trees such as trees with dense, sparse or no foliage, let the students experience the differences in the type of the shade below each tree.
- Complete this activity in 20 to 25 minutes. Each group must make observations of each tree selected by the teacher. Ask the students to record the time of the day when the observation is recorded.

Objectives:

To help the students understand the diversity in the types of tree barks and the difference in the shade patterns of the trees

- Thereafter collect all the drawings of the barks and show them to the entire class and highlight the diversity seen in the bark types.
- Check the description of the tree shade written by the students in their notebooks. Write the name of the trees and the description of their shadows on the board and engage them in a discussion about the tree types with the following examples:
  - The type of the shade of a tree depends on the type of the foliage of the tree.
  - The trees that are full of leaves throughout the year, always have a dense shade are called evergreen trees - e.g. Mango, Tamarind, etc.
  - The trees that shed leaves for sometime of the year, have a sparse shade or no shade are called deciduous trees- e.g. Flame of the Forest, Indian Coral tree, etc.

43 Trees Surrounding Us - A Slideshow

Indoor

Unit

Plants

Activity Duration

1 hour

Activity Month

February

Method

Slideshow with the help of the audio-visual equipment, discussion

Material

Projector

Instructions for Teachers

Refer to the 'slideshow' from the website link provided for additional information and study it. Use the information during the presentation of the slideshow.

Activity

- Present the slideshow to the students and describe the trees with the help of the information in it.
- After the slideshow, ask the students if they have seen any of the trees from the slides and if they know any additional uses of the trees.

Objectives:

- To introduce the students to the common local trees
- To help the students understand the importance of the trees for the birds and the butterflies

44 Story Telling

Indoor

Activity Duration

2 hours

Activity Month

February

Method

Listening and writing

Material

Notebook, pen

Instructions for Teachers

- Ask the art teacher to sketch a 'Green Bee-eater' on the blackboard before the activity.
- Before the story telling session, note the explanations of the difficult words listed at the end.
- Read the story given below to the students by employing voice modulations and expressions.

Objectives:

- To give information through story telling
- To help the students improve their listening and comprehension skills

Activity

- Read out the story given below to the students.
- Ensure that they follow the story by taking a pause after every 2-3 paragraphs and ask the students to note down the difficult words and tell the meaning.
- After the story reading session, ask the students to write a story about a bird that they know.
- Green Bee-eater by Prakash Gole, from the book *Nisargayatra*. Originally in Marathi and translated here.

Green Bee-eater

-Prakash Gole

Introduction to the author: Prof. Prakash Gole (1938-2013) – an economist by training, was also a well-known ornithologist and environmentalist. With the vision to publicize the idea of nature conservation, he founded the Ecological Society in Pune in 1982. He worked relentlessly for nature restoration and awareness about the same. He started a one - year postgraduate diploma course in 'Sustainable Management and Conservation of Natural Resources' at the Ecological Society of Pune in 1998. He has written many literary and scientific books about nature, conservation, sustainability and restoration; '*Ranava*', '*Nisarga ani Manus*', '*Nisargachya Aashavaata*', '*Katha Kokan Kinaryachi*', '*Vaastav*' are a few of his books.

I often go for a walk to the Law College Hills in Pune and I like to spend time on the Western slopes of the hills. When it is close to twilight and the Sun fades off by the hill ranges on the horizon - suddenly I hear bird calls that sound somewhat like "trree, trree, trree" - soft whistling trilling calls that announce the arrival of tiny planes landing on a nearby tree, with a sudden flash of their wings highlighted by the setting Sun! The elegant green coloured birds make short swoops before returning to the perches, roost together on branches seemingly transforming a leafless tree into a tree with foliage of light green colour.

One is fortunate to witness this beautiful sight for some passing moments before dusk and that is why I love to frequent this side of the hillock. This exquisite bird with bright emerald green plumage, melodious call, tiny delicate body, and a graceful flight as it catches insects, bees, and other prey after enjoying some somersaults in the air is a sight to behold.

Have you ever seen these pretty birds with grass-coloured cloaks? They are easy to spot, roosting on cable lines or on the periphery of gardens or farms, enjoying a swing of a blade of grass, hopping from bush to bush in a grassland, and at night several flocks come together to roost on a tree. The Green Bee-eater is a very common bird sighted across India.

As small as a sparrow and almost entirely green in colour, its head and neck have a reddish tinge. It has a slender black stripe running from the bill through the eye, just like the Grey Shirke, and this stripe easily hides its beautiful ruby-coloured eyes! The throat band resembles a pretty black pearl necklace, while its wings have a lovely blue tint. Its two central, narrow, long black tail streamers are also distinctive. This elegant bird with a long tail and a long slightly curved beak resembles a tiny aeroplane as it spreads its wings. The sun rays adorn it with a rich royal coronet enhancing the orange red colour of its crown.

These little birds nonchalantly hunt for bees and insects, hold the prey in their beaks and swoop back to their perch after a lovely acrobatic glide. They clean any dirt on the prey by striking it several times against a hard surface.

The gregarious Green Bee-eaters are easily sighted during the day time, but I was once fortunate to have seen them early in the morning in a flock of six to seven, perched on a cable. They were roosting very close to each other and thus getting warmth on that cold morning!

The Green Bee-eater has a vast range of distribution stretching from Egypt to China. Another bird, slightly larger than the Green Bee-eater, with an orangish chest and a blue tail frequents streams and shores. I have sighted two pairs of such 'Blue-tailed Bee eaters' only once near the Katraj lake in Pune towards the end of the monsoons but unfortunately that was the only time I sighted these birds. The Bee-eater found in Kashmir is an European species and it can be easily identified because of its yellow throat and blue coloured chest and belly.

The species found in the eastern foothills of the Himalayas in the Terai region and in the Malabar region also have a yellow throat and ruby coloured eyes and neck. Yet another larger Bee-eater species found in the Himalayan forests displays blue coloured forehead, throat and chest, while its belly and tail are greenish brown in colour.

You will never be able to spot a Green Bee-eater's nest on a tree! They nest in burrows dug near rocky habitats near rivers or streams. These burrows are almost like a small tunnel! At the end of this tunnel, is a little larger cavity where the female lays 4-7 white eggs after February. The young ones are fed by both the parents and the chicks stay in the nest till May-June.

Though this elegant bird is often sited in our neighbourhood, I always like watching it in the evening! I get overwhelmed when I see these pretty birds flapping their wings before gliding again as they gleam in the sunrays. It reminds me of tiny planes flapping through the winds! I am overjoyed when these birds flock together on trees adorning it with lovely green clusters.

Additional Information for Teachers

- Meanings of some difficult words
  - Ornithologist - One who studies birds
  - Stripe - a long, narrow band or strip
  - Range of Distribution (of birds) - geographical range where a bird is found naturally, it can range from a small area to multiple continents

45 Forest Food

Indoor

Unit

Plants

Activity Duration

1 hour

Activity Month

March

Method

Interview, discussion

Material

Notebook, pen, pencil

Preparatory Activity

- Make groups of 4-5 students each. As an assignment before the activity, ask the students to discuss and collect information about foods (edible vegetables, fruits, nuts, seeds) which would be or even now are collected from forests with the elderly people at home and in the neighbourhood. Here are a few questions that can be asked:
  - Name of the forest food
  - Months during which it is available
  - Names of fruits which were available in the past and in the present
- Also ask the students to visit the local market and record the forest food available for sale

Instructions for Teachers

- Check the website link for additional information. Make a list of such food available locally and collect more information about it.

Objectives:

To introduce the students to the various types of forest foods

Activity

- Check if the students have completed the assignment and ask them to discuss the following :
  - What are forest foods?
  - When are these fruits available? In which month?
  - Which of these fruits have they eaten?
- Then ask each group to read out the information collected by them and record it on the board in a tabular format as follows:

Name of the forest food	Availability in which month	Information (colour, shape, special characteristics)
Karanda		
Jamun		
Tamarind		
Indian Jujubes / Ber		

- Add the details of the other forest foods and ask the students if they have eaten any, and which is their favourite. Also inform them about the high nutritional value of such forest food.
- After the discussion, ask the students to make a note of the information and the table in their notebooks.

Additional Information for the Teachers

Some Common Forest foods of India

- Karanda
- Jamun
- Indian gooseberry/ Avla/Amla
- Mango
- Tamarind
- Moringa
- Jackfruit
- Kait (Kavath)/ Wood Apple
- Colocasia
- Bor/ Ber/ Indian Jujube
- Tembhurni/Tendu
- Mahua
- Bibba - Godambya - Marking nut
- Shelu/ Shindi - wild dates
- Gongura
- Lingon/ Lingdi
- Hisalu
- Kokam
- Risoi
- Acchoi
- Masroi
- Amoni
- Kair

46 Tree Portrayal

Indoor

Unit

Plant

Activity Duration

1 hour

Activity Month

March

Method

Discussion, development of individual expression

Material

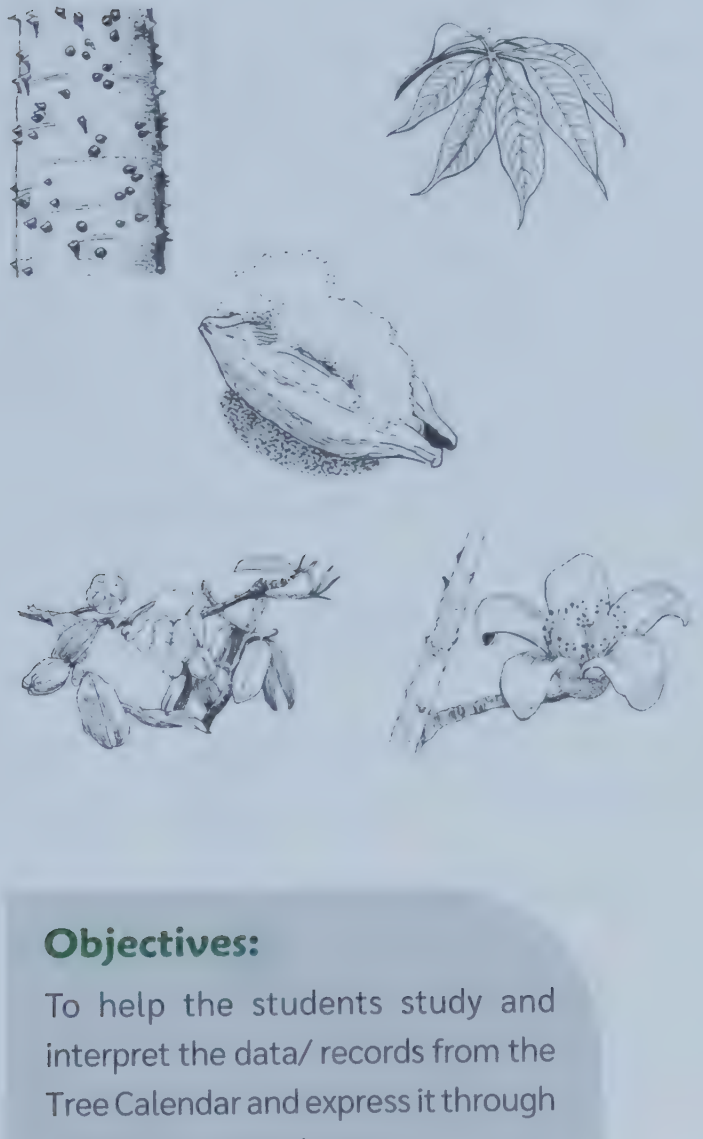
Paper, pen, pencil, crayons and colour pencils

Instructions for Teachers

Check the entries made by the students in the 'Tree Calendar' maintained by them. Engage them in a discussion about the changes seen in the trees through the year.

Activity

- Maintain the same groups of students as created for the Tree Calendar activity through the year. Ask the groups to study the records made by them from the Tree Calendar and discuss the changes observed in the trees in different seasons, within their groups.
- Encourage the students to express these changes observed as per the months or the seasons - e.g. the change in the colour of the leaves, shedding of the leaves, flowering and fruiting, etc. Ask them to work individually, to articulate these changes in their chosen form of expression - a sketch or a poem or an essay.
- Here are a few ideas for expressing themselves,
  - A poem on the seasonal changes observed in the tree
  - Essay - An autobiography of a tree
  - Sketch the different parts of a tree- trunk, flowers, leaf pattern, bark and trunk etc.
- At the end of the activity, ask them to present their work in the class.



Objectives:

To help the students study and interpret the data/ records from the Tree Calendar and express it through a sketch/an essay/a poem

47 Review - 2

Indoor

Activity Duration

1 hour

Activity Month

March

Method

Quiz

Material

Notebook, pen

Instructions for teachers

- This is a review of all the activities and topics covered till now. Include questions given below as well as prepare a list of questions based on previous activities.
- Also, ask the students to come up with a list of questions for the quiz. Reserve half the time for the quiz prepared by the students. The process and participation of the students is much more important than the number of questions they come up with.
- Make sure that all the students are present during the review.

Activity

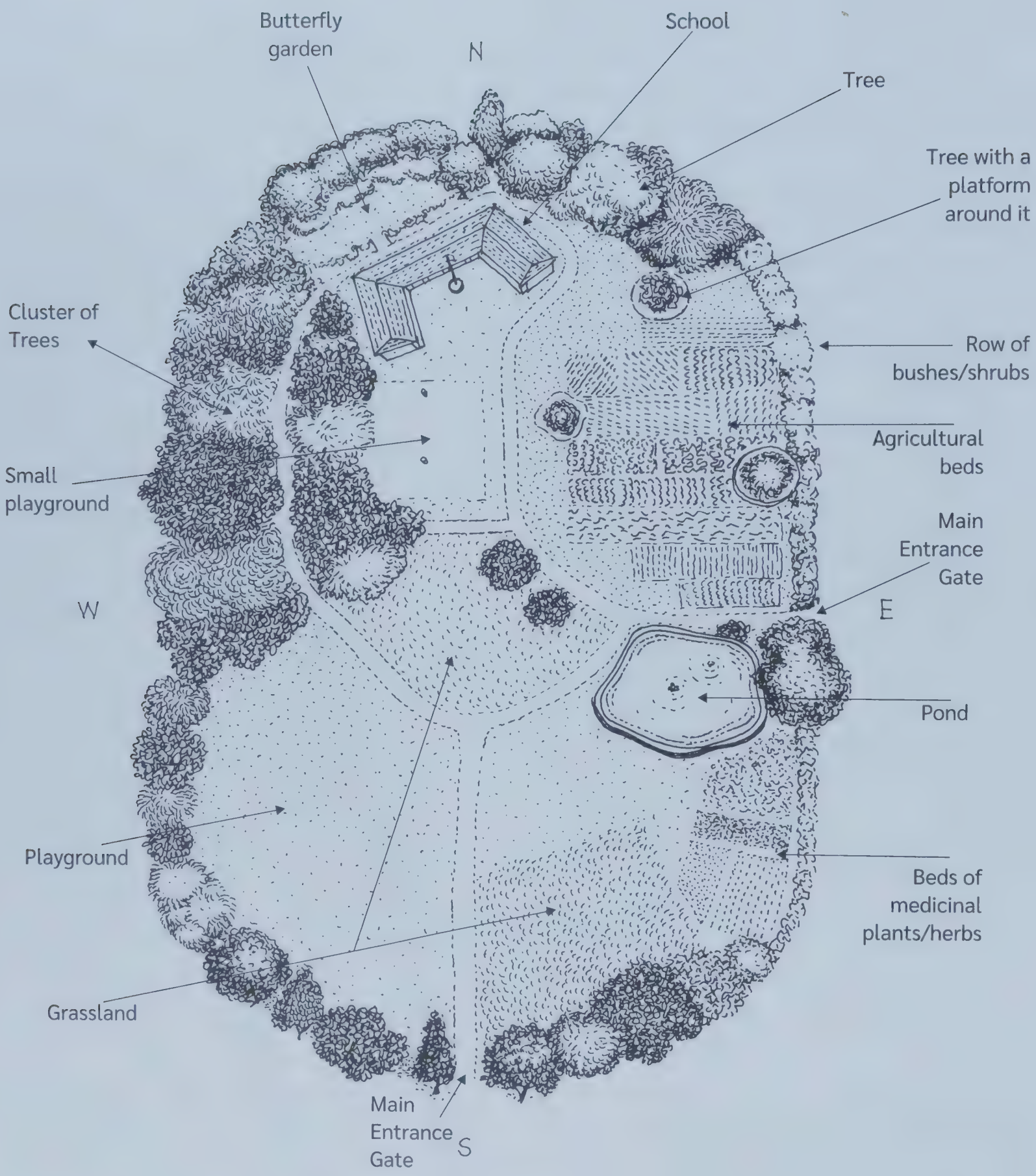
- Conduct a Quiz using the following questions.
- Divide the class into groups of 6-7 students.
- Ask them to sit with their groups and help them decide a name for their group - they may choose names of the flora/ fauna, for example, Orchid tree, Flame-of-the-Forest, Mango, Jamun, Deer, Tiger, Gaur, etc.
- Establish general rules for the quiz.
- Draw a score chart on the blackboard to note the points earned by each group.
- Questions like 'True or false', 'Fill in the blanks', 'Answer in one sentence' will get 1 point each and questions requiring a descriptive answer (questions with 'describe') will get 2 points.
- Ask each group to prepare quiz questions and to come forward and conduct the quiz.
- Thereafter, teacher can conduct the quiz as needed using the following questions:
  - How many layers are there in the soil?
  - What are the organic and the inorganic components of the soil?
  - Name the deepest layer of the soil.
  - Which layer of the soil is the most fertile?
  - Name some organic and inorganic components from your surroundings (minimum four).
  - Which crops are cultivated by the local farmer who conducted the session on farming?
  - During the post monsoon trip to the stream, how was the water level? Was it more than the level recorded during the monsoon or was it less than that level?
  - What are the different types of pollution?
  - Which diseases / health hazards are caused by exposure to smoke for a long time?
  - What are the components of the soil?
  - Describe the soil on the bank of a river / stream.
  - Describe the soil in a farm.
  - Describe your three favourite trees from the school campus.
  - Name the main components observed during the garden visit
  - Name the activities in which you assisted the farmer while working on the farm.
  - Name the important activities in agriculture.
  - Name some trees in the garden.
  - Which type of soil holds water for a very short period?

Objectives:

To help the students revise the previous activities

- During the activity of tracing the tree trunks, which tree was observed to have a very rough bark?
- It is important to have biomass in the soil. State whether true or false.
- Name your favourite forest food.
- Which tree has a dense shadow?
- Which tree has a sparse shadow?
- Write the steps that can be taken to reduce the pollution during the Ganesh festival in 4-5 sentences.
- Paddy crops need very little rainfall. State whether true or false.
- Write the steps that can be taken to reduce the pollution during the Diwali festival in 4-5 sentences.
- Name three trees which are in blossom currently.
- Name the main local crops.
- Name any three water pollutants.
- When a Ganesh idol is immersed in the river, it gets polluted - State whether true or false.
- Which energy is used when we 'sweep the house'?

Green School Campus Development - Guide

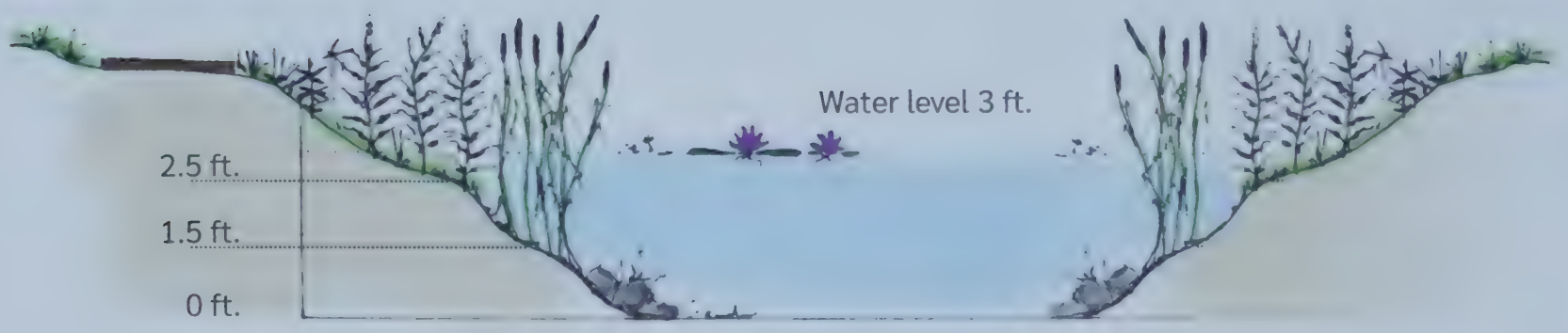


Green School Campus Development

- The school premises can be developed as per the available space by using some or all the components suggested in the reference diagram above. Different components like a butterfly garden, cluster of trees, tree with a platform around it, agricultural beds, pond, grassland, garden of medicinal herbs/ plants, playground, etc. can be developed so as to create habitats for local biodiversity by using various native plants. Thus the students will get the opportunity to experience and observe biodiversity and seasonal changes in the nature within the campus.
- Refer to the website link provided for additional information for region wise plant list for **Green School Campus Development.**

How to build a pond –

- Depending on the space available in the school campus, dig a pond of a diameter 10 ft. to 30 ft. and a dept of 3 ft. to 4 ft. The pond should be deep at the center with gradual slopes on the sides leading to the ground level (as shown in the diagram). Plant various plants (as per the list) on the sides. If possible, arrange for refilling or circulation of water in the dry season and maintain the level of the water in the pond throughout the year.
- Refer to the website link provided for additional information for aquatic plants for making a pond.



What is 'Constructivist Approach' in Education?

The learning process based on the philosophy of constructivism is such that the children learn

- by themselves
- as per their likes and dislikes and self-motivation
- through practical experiences
- by continuously engaging into activities
- by mutually helping each other

Constructivist approach in Education : Principle 1

The children must get an opportunity to learn on their own, as:

- Learning means getting acquainted to one's surroundings
- Humans learn on their own as it is a natural ability
- The brain is the organ that facilitates human learning
- Understanding the world is a continuous ongoing function of the brain
- Self-learning is therefore natural, while learning from others is not

Therefore, encourage your children and give them opportunities to learn on their own.

Constructivist approach in Education : Principle 2

Provide opportunities to children to do work as per their choice while nurturing their innate motivation to learn

- At an early age the brain grasps and learns at a fast space
- Children like to learn continuously
- What one likes is pursued and learnt better
- When provided with multiple opportunities, children enjoy making their own choices.

Therefore, learning happens faster and enthusiastically.

Constructivist approach in Education: Principle 3

Children must gain age appropriate varied experiences, as:

- Childhood is the best age for the brain development
- A learning brain needs food for thought, a lot of activities and engagement
- The brain needs experiences of diverse types
- Physical activities, babbling, friendly banter, laughing aloud, non-stop physical movements provide various experiences to the brain
- Mental abilities are sharpened by the various experiences

Therefore, plan and ensure that the children are exposed to a wide variety of experiences.

Constructivist approach in Education: Principle 4

The best way to learn is through action, as:

- Continuous 'listening' tires the brain
- Monotonous learning restricts the development of the brain
- The brain searches and seeks things constantly, and so activity based learning keeps the children engaged and engrossed
- Children do not like to sit idle
- Being idle hinders the development of the brain

Therefore, provide numerous opportunities and encourage the children to do activities on their own through a hands-on approach.

Constructivist approach in Education: Principle 5

Children must get an opportunity to learn by working with others, by helping and supporting each other, as:

- Humans are social by nature
- Appropriate brain development needs help and support from the others
- Working together helps the comprehensive learning
- The need for friendship is fulfilled when children work together
- A sense of cooperation is instilled in them

Therefore, let the children play, work and learn with their friends of different temperaments in different situations.

How to implement constructivism in classrooms?

Classroom teaching must move from 'Teaching' to 'Learning'. We must stop 'teaching' the children constantly and encourage them to learn by themselves. Let them practice self-learning, while the teachers play the role of facilitators in this process of learning. The school and the classroom environment, its layout and infrastructure must encourage and aid the process of learning – this type of education is the 'student-centric' education system.

Classroom education should move away from bookish knowledge towards experiential learning. In a classroom setting, providing opportunities to the students for learning is letting them deal with the various factual and complex experiences just like in real life situations. Expose the students to the best possible experiences within the limits of the classroom. But offering them the field experience outside the classroom is crucial. This will give them the exposure to the actual and real life situations related to nature and the human life - this type of education is the experiential learning.

Students must explore the topics of study beyond their textbooks. This exploration may be individual at times, or co-experienced with a study partner or in a group in the form of team work. The teacher must present the study topics as open ended subjects and must encourage the students to take initiative, participate and explore, thus facilitating the 'Self Learning' process for the students.

The Pillars of Constructivism - Theory of Multiple Intelligence

Psychologist Howard Gardener (1942) in his book 'Frames of Mind' (1983) presented a new concept about the Human Intelligence. This new concept challenged the orthodox definition of intelligence. As per the theory of Multiple Intelligences -

- There are multiple kinds of intelligences instead of just one.
- Intelligence is not genetic but innate in nature.
- Intelligence can grow if given the right kind of opportunities.
- Every person possesses all these types of intelligences, in more or less proportions.
- However, the spectrum of the intelligences of each person is different.

Howrard Gardner has presented eight types of intelligences:

1) **Linguistic Intelligence**
   - Interest and aptitude in the linguistic activities
   - Expertise in multiple languages
   - Inclination and aptitude towards philosophical and creative literature / writing

2) **Logical-Mathematical Intelligence**
   - Effective logical thinking
   - Interest in abstract subjects and thinking
   - Analytical intellect
   - Inclination towards science and mathematics

3) **Musical Intelligence**
   - Sensitivity to sound
   - Understanding and use of rhythm and tempo
   - Fields of work – singing, playing a musical instrument, composing music

4) **Spatial Intelligence**
   - Ability to create a mental image of the structures, shapes, etc. perceived
   - Judgement of distances
   - Reading and understanding of geographical maps and being able to create them
   - Fields of work – work related to art, architecture, sculpture, engineering, surgery

5) **Bodily-Kinesthetic Intelligence**
   - Control over body balance and bodily movements
   - Ability of expression through body language
   - Fields of work - related to dance, sports, acting and surgery

6) **Naturalist Intelligence**
   - Liking for nature
   - Observations of various events and objects in nature
   - Interest and aptitude in grasping, organizing and categorizing
   - Ability to get engrossed in nature related areas such as the flora, fauna, etc.
   - Fields of work - related to nature

7) **Interpersonal Intelligence**
   - Ability to understand the feelings of others, to get along with others and to influence others
   - Empathy and compassion for other people
   - Fields of work – related to teaching , leadership etc. (teachers, leaders etc.)

8) Intrapersonal Intelligence

- To be aware of and to identify one's own feelings and temparament.
- To take decisions based on one's own mental and emotional capacities and capabilities
- Fields of work – related to social and spiritual leadership.

Multiple Intelligences and Education

- In a learning environment, we must keep in mind that every child is different with respect to the intelligence.
- There is a close relation between a person's innate intelligence and his/her liking, inclination and aptitude in different activities.
- There is a close relation between a person's innate intelligence and the ability to comprehend and the method of learning.
- In a school classroom, each child may excel in some area and not perform well in another.
- It is essential to identify the intelligences of each child and plan the learning activities accordingly.
- A student's intelligence can be enhanced by making suitable opportunities and experiences available through thoughtful planning.

Multiple Intelligences and School Education

- In a learning environment, it is necessary to look at the students based on their various intelligences.
- It is necessary to make appropriate changes in the school and classroom settings.
- It is important to focus on individual learning in the classroom setting.
- It is essential to consciously eliminate the discrimination based on the 'smartness' or the 'dullness' of the students.
- It is the responsibility of the teacher and the school to identify the intelligences in each child and guide them accordingly.
- The school environment, infrastructure and methods and systems must ensure that each student will get the exposure to multiple intelligences.

New Education (through constructivism) is different from the Current Education!

1. The current education creates questions.
   The new education will provide answers.
2. The current education connects with the past!
   The new education connects with the future.
3. The current education channelises the focus in one direction!
   The new education revolves around the learner from all the directions.
4. The current education makes only a few people successful!
   The new education helps everyone achieve success.
5. It is time to change!
   And that is why we must change our education.

Constructivist education is student-centric. Research on subjects like comprehension, brain and neurology, psychology and intelligence, etc. provide a lot of new information about the learning process in children. All this information leads to a few basic principles of the student-centric education, which are enlisted below:

- Principle of self-learning
- Principle of first-hand experience
- Principle of self-created meaningfulness
- Principle of challenge
- Principle of completion

Principle of self-learning in student-centric Education

Every individual has a natural inspiration and ability to learn. Research has proven that efforts for learning begin at birth. The age-old belief that the "children's minds are like a clean slate, and someone teaches them by writing on this slate" is not acceptable today. The principle of self-learning must be accepted and adopted in the current times.

Principle of first-hand experience in student-centric Education

Self-learning is learning through the experience as it is the most effective way of learning. Driven by our needs, we assimilate knowledge through our experiences. Therefore, it is essential that all learning is based on one's own experience. In the process of education, the students must get exposed to diverse types of experiences like simple and complex experiences, abstract and concrete experiences, profound experiences, experiences of people, experiences of different feelings, etc.

Information - Skills - Knowledge

- What we come to know is information!
- Knowing how to use it is a skill!
- What we learn from it is knowledge!

Information – Skills – Knowledge – Action – Creation – Personality Development - Community Development – Cultural Development

Six levels for knowledge creation for a learner

- **To get to know:** to gather the information about the world with the help of the sensory organs.
- **To comprehend:** to understand the meaning of the information gathered.
- **To assimilate:** to deeply inculcate the necessary aspects from what is understood in mind.
- **To contemplate:** to process the aspects inculcated/assimilated in the mind with a particular purpose.
- **To relate:** to establish relations between the topics contemplated and previous experiences in life.
- **To express:** to express the knowledge consolidated in the mind.

As per the Constructivist approach in Education, when students get the experience of all the six levels mentioned above, only then will the expected process of knowledge creation take place at the students' level.

Principle of self-created meaningfulness in the student-centric learning

This principle explains how humans learn through experience. The Human brain is continuously engaged in finding meaning of the events and occurrences in the immediate surroundings, which may include situations, images, sound-language, etc. These perceived stimuli are compared with the past experiences and meaning is derived from its analysis. A student shapes the knowledge in a similar pattern, which is called self-learning. This type of knowledge is long lasting.

Principle of challenge in student-centric Education

A child learns by gaining new experiences and finding meaningfulness in them.

Once the child knows an activity well, he/she begins to lose interest in it as children get bored by repetition. Once a goal is achieved, they have an innate desire to take the next step as they enjoy a new challenge at every step - they get engrossed in it and learn from this engagement. Every new challenge is a pleasant stress/tension and gaining the new experiences and internalising them is a natural phenomenon. The stress of challenge enables this process, and in this way, one gets the pleasure of the natural fulfilment of the objectives/purpose which makes the entire learning process blissful.

Main Principles of Constructivism in Education

The schools and the teachers should adhere to these principles in the actual process of teaching in the classrooms:

- Learning is a continuous process.
- Learning is an experience-based process.
- Learning is an intellectual process.
- In the course of learning, the students understand how to learn.
- Learning is contextual in nature.
- Learning is not only an individual but also a social action.
- Language is at the centre of the learning.
- Knowledge gets build based on the previous knowledge.
- New challenges inspire learning.
- Sufficient time is required for the learning.
- Others may help in the learning.
- Learning needs the mental stability.

- **Ramesh Panse,** (Article published in '*Gunavattapurna Shikshan*, *Sandarbha Smaranika*, 19 November 2012, *Gram Mangal*, Pune'. Originally written in Marathi, translated for this book.)

Reference Books for Additional Reading for Teachers and Students

(✾ Mark signifies that the book can be used by the students too)

- Amazing adaptations, Sukanya Datta, National Book Trust of India, New Delhi
- Among tigers and tuskers, Ramesh Bedi, National Book Trust of India, New Delhi
- Back to Nature, B.K.Trehan, National Book Trust of India, New Delhi
- Common Trees, H. Santapau, National Book Trust of India, New Delhi
- Elephant: Lord of the Jungle, Ramesh Bedi, National Book Trust of India, New Delhi
- Environmental Pollution, N. Manivasakam, National Book Trust of India, New Delhi
- Exploring the Biological World, Rohini Muthuswami, Sukanya Datta, National Book Trust of India, New Delhi
- Fishes, Mary Chandy, National Book Trust of India, New Delhi
- Indian Mammals a field guide, Vivek Menon
- Insects, M. S. Mani, National Book Trust of India, New Delhi
- Joy of Learning, Centre for Environment Education, Ahmadabad
- Jungle Trees of Central India, a field guide for tree spotters, Pradip Krishen
- Primer on Characterising Biodiversity, P.S.Ramkrishnan, National Book Trust of India, New Delhi
- Small Science, a series in Primary Science, Teacher's Book, Class 5, Developed by Homi Bhabha Centre for Science Education, Published by Oxford University Press
- Small Science, a series in Primary Science, Textbook, Class 5, Developed by Homi Bhabha Centre for Science Education, Published by Oxford University Press
- Social life of Animals, Sukanya Datta, National Book Trust of India, New Delhi
- Social life of Plants, Sukanya Datta, National Book Trust of India, New Delhi
- Textbook of Botany, First Year, B.Sc.
- Textbook of Geology, First Year, B.Sc.
- The ailing forests of India, C.K.Karunakaran, National Book Trust of India, New Delhi
- The environment education handbook, a teachers resource, Centre for Environment Education, Ahmadabad
- The Monsoons, P.K.Das, National Book Trust of India, New Delhi
- The Planet Earth, S.M.Mathur, National Book Trust of India, New Delhi
- ✾ Birds of Peninsular India, a pocket guide to 135 familiar birds, early bird and nature conservation foundation (available at BNHS)
- ✾ Birds of the Indian Subcontinent, Richard Grimmett, Carol Inskipp & Tim Inskipp, Oxford

- Butterflies of BNHS Reserve, a pocket field guide, BNHS and MMR Environment Improvement society
- Butterflies of Peninsular India, Krushnamegh Kunte, University Press
- Common Indian wild flowers, Issac Kehimkar, Bombay Natural History society
- Field guide to Indian Mammals, Vivek Menon, DK Delhi
- Field guide to Mangroves of Maharshtra, N. Vasudevan, Merwyn Fernandes, Mangrove cell, Maharshtra Forest Department, Mumbai
- Field guide to Marine Life of India, Deepak Apte
- Fishes of India, B. F. Chhapgar, Oxford University Press & WWF India
- Flowers of Sahyadri, Shrikant Ingalhalikar, Corolla Publications, Pune
- Further flowers of Sahyadri, Shrikant Ingalhalikar, Corolla Publications, Pune
- Insects of BNHS Reserve, a pocket field guide, BNHS and MMR Environment Improvement society
- Moths of BNHS BNHS Reserve, a pocket field guide, BNHS and MMR Environment Improvement society
- Seashore life of India, B.F.Chhapgar, Oxford University Press & WWF India
- The beautiful world of butterflies, Centre for Environment Education, Ahmadabad
- The book of Indian Animals, S.H.Prater, Bombay Natural History Society
- The book of Indian Birds, Salim Ali, Bombay Natural History society
- The book of Indian Butterflies, Issac Kehimkar
- The book of Indian Butterflies, Issac Kehimkar, Bombay Natural History Society
- The book of Indian Reptiles & Amphibians, J. C. Daniel, Bombay Natural History Society & Oxford University Press
- The book of Indian Shells, Deepak Apte, Bombay Natural History Society
- The book of Indian Trees, K.C.Sahni, Bombay Natural History society
- Trees of BNHS Reserve, a pocket field guide, BNHS and MMR Environment Improvement society

Reference Books for Additional Reading for Teachers and Students

Apart from the reference books and field guides we recommend light reading for the students and teachers from the regional languages and in English, some of the titles are - Children's books by Ruskin Bond and Jim Corbett, Dersu Uzala by Vladimir Arsenyev, The Yearling by Marjorie Kinnan Rawlings, Totto-Chan: The Little Girl at the Window by Tetsuko Kuroyanagi, Unstoppable Us- Volume 1 (How humans took over the world) by Yuval Noah Harari, among others.

Reference Websites for Environment Related Information

- www.arvindguptatoys.com/
- www.bnhs.org
- www.ceeindia.org/cee/publications.html
- www.cere-india.org/publications/
- www.grammangal.org
- www.hbcse.tifr.res.in/publications
- www.kalpavriksh.org/
- www.oikos.in/
- www.theecologicalsociety.org
- www.vigyanprasar.gov.in/digilib/
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- Wikipedia and Wikimedia Commons

Condensed Module

If all the activities in the book cannot be conducted due to time or resource constraints, here is an outline of a condensed module, with half the number of activities. Titles of some of the activities have been changed and they are a combination of multiple activities as mentioned. For example, Introduction to Plants is a combination of activities 10,11,12 and can be conducted together.

Serial No.	Condensed Modules	Refer to Activity no.
1	Tree Calendar	1
2	Map Reading	2
3	Introduction to Streams	Combine 5 & 6
4	Water in Daily Use	7
5	Introduction to Plants	Combine 9, 10, 11
6	Classification of Animals	12
7	Mammals	13
8	Insects	14
9	Reptiles	15
10	Birds	16
11	Butterfly Watching	17
12	Session with a Snake Rescuer	18
13	Quadrat Study	19
14	Food Web and Food Chain	21
15	Introduction to Rocks	Combine 22, 23
16	Observing the layers of the Soil	Combine 26, 27
17	Elements in our Surroundings	28
18	Map of the School & Surroundings	29
19	Introduction to Local Farming Practices	Combine 31, 32, 33
20	Water Pollution	39
21	Best from Waste	40
22	Fun with Trees	Combine 41, 42
23	Slide Show - Trees Surrounding Us	43

Notes

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About Oikos for Ecological Services :

Oikos for Ecological Services is working on ground in ecological restoration of landscapes since 2002. Some major areas of work have been in restoration, biodiversity conservation, propagation of native plant species, conserving soil and water and other natural resources management in the different parts of the country.

www.oikos.in

About Adhiwas Foundation :

Adhiwas Foundation is a non-profit organization founded in May 2018, registered under charity commissioner as a public trust. Adhiwas Foundation is established for filling the gaps in baseline as well as long term studies in the field of ecology, biodiversity, conservation, restoration, landscape level planning and nature education for both kids as well as adults.

www.adhiwas.org

About EFL Global :

EFL Global is a leading supply chain and logistics solutions provider that is committed to simplifying logistics for businesses through flexible, transparent, and future-ready solutions. With growing concerns about climate change, we have undertaken initiatives to ensure that we keep the best interest of our planet and its inhabitant at the core of how we work. We continuously enhance our sustainable standards through partnerships and voluntary memberships in global governing bodies and organisations. As members of the UN Global Compact and the Ethical Trading Initiative, we sustain the highest benchmarks of sustainable transportation.

www.efl.global